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A NATIONAL CATTLE POLICY[1]

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The Executive of the Eastern Section of the Canadian Society of Animal Production asked me to open a discussion on this subject and I accepted with reluctance. The hesitation was based not on lack of interest in or a realization of the importance of the problem, but rather that the subject embraces so many governmental and professional activities that an enormous amount of study would be necessary, much more in fact than my time would permit.

The following analysis of the different aspects of this problem, with comments and suggestions, must then be considered at this time as a basis for a discussion rather than mature recommendations of any group of technical agriculturists.

In order to get a most intimate picture of existing and needed changes in our cattle practices in all parts of Canada, I have not hesitated to ask for information and other assistance from Federal and Provincial Live Stock Commissioners, the Dominion Bureau of Statistics at Ottawa, the heads of our Animal Husbandry Divisions at Agricultural Colleges, and others. Had time permitted I should like to have also gone much farther afield and obtained the criticisms and opinions of men in commercial aspects of the beef and dairy cattle industries of Canada. If, however, this subject is worth pursuing by our Society this is work which might well be undertaken by an organized committee both of the Eastern and Western sections.

I beg to acknowledge with thanks the prompt and hearty assistance which I had from those with whom I corresponded.

In approaching this subject one might well ask the question, "Is it possible to have a National Cattle Policy which will embrace the many aspects of our cattle industry?"

We already have many policies dealing with the live stock situation in Canada, at least some of which are as follows:—

1. Federal Bull Loaning Policy.
2. Federal Advanced Registry for Pure Bred Dairy Bulls.
3. Canadian Record of Performance for Pure Bred Dairy Cattle.
4. Federal Beef Grading Policy.
5. Federal Transportation Policy with a view of assisting farmers in Western Canada to establish themselves in the breeding of cattle.
6. Federal and Provincial Calf Club Policy.
7. Federal and Provincial Joint Bull Policies.

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In addition, too, many of the Provinces have certain live stock policies such as Cow Testing and Bull Purchasing Policies.

Again, in connection with the health of our cattle, Federal and Provincial Departments of Agriculture are heavily involved in tuberculosis eradication policies, including Accredited Herds, T.B. Free Areas, and the like.

How then would it be possible to embody these and other aspects of our cattle industry into one policy? Frankly I doubt the wisdom of even attempting anything along these lines.

The danger of still further multiplying our numbers of policies is perhaps greater than we realize. I often wonder what would be the reaction of the average, or even our leading, live stock farmers, if we were to ask them to enumerate those policies now existing under Federal and Provincial regime within their provinces.

Not infrequently also we hear from taxpayers complaints regarding too much paternalism and government leadership to our farmers in matters in which the farmer himself should in co-operative effort assume the full responsibility and cost. Obviously such criticisms are made by people who have not the broadest knowledge of our industry and the needs for rapid improvement if Canadian live stock might continue to compete with the live stock of other countries. The farmer is not in a position to conduct research in any phase of our live stock industry. Moreover, public health so closely associated with animal health must of necessaity be protected with public funds. Farmers individually and collectively are not in a position to establish grading and branding systems as a guarantee to either domestic or export markets as to the healthfulness or the relative value of animal products.

Co-operation amongst farmers has been actively preached from one coast to the other over a long period of years, yet it seems so difficult to establish a background of co-operative philosophy in our scattered and heterogeneous population. Many excellent farmers in all parts of Canada are responsible for practices in production which result in a low grade product which is detrimental to the whole industry both on domestic and export markets. In other words, the average farmer probably knows much better than he practices. Whether it is possible to accomplish in Canada by acts, law, or other policies, what Denmark with her small country and homogeneous population has been able to do co-operatively is quite another matter.

Hence, in attempting to analyze this topic, I should like to voice my personal opinion that whatever changes of existing policies may be made in numbers or effectiveness, or whatever new policies may be evolved by governments, associations, co-operatives, or others, that the importance of educating the farmer as to his responsibility toward the whole industry be kept uppermost. In any such educational effort to a greater degree than in the past, the live stock producer of this country should be induced to lean less and less on the taxpayer for subsidies, compensations, grants, and the like.

Equally it is my candid opinion that in the problems of costs in organized marketing, particularly in relationship to our export trade, and in protection of human health against animal diseases, and in protection to the

Canadian live stock industry as a whole against the introduction of foreign diseases, the taxpayers of Canada must carry the load to a degree possibly greater than ever before.

I should like to discuss some of the major problems of our live stock industry in the order of importance in which they appear to me, not with the idea of welding these into a single policy or the creation of a new policy, but rather with the hope that suggestions may be forthcoming whereby existing policies and organizations may more effectively aid in bringing a degree of prosperity and permanency to our live stock industry which is not apparent at the present time.

FEEDS AND FEEDING

In my opinion better feeding systems are basic to all our live stock policies and developments. I have often wondered how much greater progress might have been made in cow testing work throughout Canada if we had first induced the farmer to so improve his crop practices of pasture and winter crops that he would have had more abundant and more nutritious feeds.

In the many years of assistance which have been given to farmers throughout Canada in the purchasing of pure bred live stock, including bulls, how much money has been wasted because of inadequate knowledge or poor practices in crop production? Would part of that money not have been much better spent in aiding the farmers to provide better feed supplies?

Governments past and present and their Departments of Agriculture have been instrumental in encouraging the opening up of lands which later were found unsuitable for crop production, and then have frantically looked around for some class of live stock which might aid the farmer to make a living. The same departments have in the past been responsible for developing dairy centres in the heart of the beef cattle country and have been parties to allowing and aiding the introduction of breeds of cattle through bull policies and the like into districts where the utmost harm was done through the mixing of types and breeds of live stock. Would not some of this money have been better employed in improving forages and pastures?

Live stock unions and other farmers' organizations in areas where the purchase of grain and mill feeds is advantageous and profitable at least have been instrumental on many occasions in placing before railways and railway commissions the significance of freight rates in order to provide cheaper feeds.

Infrequently departmental officers in agriculture, Federal and Provincial, have been called in for consultation, but there has been no concerted effort on the part of departmental officials in agriculture from one coast to the other to thoroughly review this situation and clearly define those areas in which the live stock industry must be dependent on imported concentrates.

Again as to feeding practices even in those districts where there is a reasonable security in crop production, such as we find here in Ontario and Quebec, the intelligent feeding of beef and dairy cattle has progressed very slowly during the past thirty years. *Balanced rations* have been advocated and described in detail at farmers' meetings in these provinces for fifty

years, yet as one visits the practical farmer or even sees his live stock in the fields, one wonders if our balanced rations are incorrect, our educational methods inadequate, or if the farmer through utter indifference finds it about as profitable to indifferently feed his live stock.

The greatest hope in this connection is found during recent years in the formation of Feeding Standards Boards. The province of Quebec, taking the leadership in this matter in the formation of a board consisting largely of technical men, has done more to systematically bring scientific and practical truths into the form of simple suggestions which any farmer may follow than had ever before been accomplished.

The province of Ontario with its Feed Committee, the Maritime Feed Board, and more recently the British Columbia Feed Board, have all come into existence with this same objective. The published results and recommendations for feeding resulting from the activities of some of these Boards are on our files and need no further comment. Resulting from their work, a much more careful economic survey of existing forage conditions, grain producing conditions, and grain imports, should be made.

The very active consideration of this problem of feeds and feeding by the Maritime Board is most encouraging. In analyzing their feeding policies they emphasize that more and better home-grown feeds are essential. This includes clear cut recommendations toward improving pastures, increasing and improving the quality of hay, increasing root production and the production of more home-grown grains with shorter rotations. These emphasize the necessity for continued and more active effort in inducing better feeding practices by clearly specifying variety of feeds, minerals in the ration, improvement of nutritive values and general education in the appreciation and uses of feeds.

Conditions in Ontario and Quebec are not at all dissimilar in this regard. The carrying power of pastures and the lower nutrition of pastures are probably the greatest limiting factors in our animal production work both as to volume and economy of production.

Poor pastures in these five provinces have done more to neutralize all our animal production policies than any other single factor.

Western Canada, although with different soil and climate, also is limited in any production policy by feeds and feeding practices. Manitoba, which more closely resembles Ontario than other Western provinces, according to our best authorities needs enormous improvements in pasture and forages as a basis for improved live stock production. Phosphate deficiency in the grass areas appears to be more marked than ever before. More legumes are needed. Minerals are needed in the feed mixtures and farmers must be taught to feed grain liberally, while at the same time building feed surpluses against those apparently inevitable drought years. An active Feed Board or Council in this province is beginning to effectively tackle this problem.

Saskatchewan and Alberta, because of climatic conditions, have a more complex problem. The Southern and Central parts of these provinces are our greatest grain-producing areas. Because of the limiting factor of precipitation, difficulties in obtaining stands of forage crops, and the inadequate water supply for live stock, mixed farming in many of these areas including a heavy cattle population is entirely out of the question.

I would refer to the very excellent analysis of this situation made by Dean Shaw at the World's Grain Conference at Regina in 1933 and the Live Stock Meetings at Moose Jaw in 1934.

North of these grain producing areas is natural mixed farming country and fortunately with a population of farmers who are liberal feeders. Improvements in feeding methods are no doubt advisable and must be worked out but this should be relatively simple.

Climate and soil types have determined that part of the southern part of Saskatchewan and Alberta and the Foot Hill country shall be a ranching country. Had this been fully realized thirty years ago the live stock industry of today would have been in better condition, while the settlers would have been saved a life-time of grief and disappointment. How to bring back this country to a high state of productivity from the ranching standpoint, how to renew the carrying power of the open ranges so that production costs may be reduced, how to supplement feed shortages both winter and summer on the more favoured soils, are vital problems on which the future of cattle ranching in Western Canada depends. No factor other than the present low prices of grass cattle from the range is of greater importance to the beef industry of Canada at the present time.

Another very interesting factor in the feeding of range cattle is the continuous demand for grain finished beef. Often one wonders if this propaganda is not carried farther than the Canadian consumer is prepared to pay or the export market is prepared to compensate. The worst of it is that in recent years those who, even under very sound guidance and supervision in feeding, have grain-finished range cattle under contract are worse off financially than they were previously. I will touch this matter again under the problem of marketing.

British Columbia interior valleys contain probably 160,000,000 acres of land suitable for grazing and crop production which is as yet undeveloped. Yet, those grazing areas now used are over-stocked and the range problem is as vital if not more so than that existing in Southern Alberta. Many points in these valleys which formerly had a good reputation of high class well finished grass cattle, according to shipping records at the present time are earning a most unenviable reputation in shipping poor cattle. This has been essentially a feed problem, yet its connection with marketing is obvious. The coastal areas which have developed dairying to an intense degree have less of a feeding problem than other parts of that province excepting in so far as the high cost of grains due in no small degree to transportation costs make the use of concentrates in dairy cattle production unduly expensive.

FREIGHT RATES

In the time at my disposal it would be unwise for me to elaborate this subject. One cannot but give fair consideration to the financial problems of the railway companies or an appreciation of the fact that during the past three years rates have been lowered somewhat, both rail and lake hauls, to the aid of the live stock industry. The fact remains, however, that because of the high freight rates less grain from the prairie provinces is consumed in the live stock areas of British Columbia and the five Eastern provinces than would otherwise be the case. Many of the local freight rates are apparently out of line with the value of product. Competitors

in other countries still have a preferential export rate. This is a most involved contentious problem but I believe that there is hope for solution.

We as technical men have not made our contribution in a survey of needs as a basis for transportation companies' action. We as technical men interested in live stock have not been active in pressing for better distributing agencies of grains and mill feeds.

May I recall to your attention the excellent start in this direction made through the activities of the coarse grain pool of Western Canada in which existing elevators, such as Prescott, Montreal, Sorel, etc., were used as a base from which ground mixed grains might be distributed by truck or train in any quantities desired. The greatest saving in this was not in doing away with the middleman but in the transporting of these grains at the lowest rate of the year and the guaranteeing of a year's supply.

Another advantage in this trade, although it might appear disadvantageous to many, was the fact that it was essentially a cash sale.

The discontinuance of this service which was becoming so well established was in my opinion a most detrimental step, for not only did it cease to distribute Western grains, which had its influence on the surplus wheat and coarse grain situation, but it discouraged the liberal feeding on the part of Eastern farmers, which in turn had its influence on production.

My recommendations then under this problem of Feeds and Feeding of live stock are as follows:—

1. That this Society undertake directly a survey of forage production in every province.
2. That this Society particularly make a thorough survey of pasture and range conditions involving carrying power and improvements needed.
3. That this Society make a thorough survey of the live stock areas in Canada where the purchase of concentrates is advisable as a basis for thorough study of freight rates.
4. That this Society respectfully recommend to each of the provinces where feed boards or councils do not exist that these be created.
5. That the Society recommend to all provinces having Feed Boards or Councils that the same should extend their activities in relationship to the above mentioned surveys and educational work in connection with improving forage, pasture and concentrate requirements.
6. That as a result of the survey of concentrate needs in various live stock centres, this Society recommend to Provincial and Federal governments, as well as organized industries, that feed distributing agencies of a nature somewhat similar to those established by the coarse grain pools be established.
7. That in connection with beef cattle from the ranges, the Society actively co-operate with other agencies, including Provincial Departments, toward working out a contract satisfactory to both rancher and feeder for contract grain finishing of baby beef or older cattle.

REGIONALIZING PRODUCTION

Is it not possible for technical men, members of this Society, working in every province in Canada to clearly define the areas in each province where due to natural conditions, markets and other factors, it would seem advisable to direct production actively toward certain types and breeds of cattle? In asking this question, I have on more than one occasion met the criticism that any coerced effort toward directing production along certain lines is inadvisable in that it destroys the initiative and independence of live stock farmers. On the other hand, it must not be forgotten that many of our governmental policies for the aid of live stock producers have been developed as corrective measures, corrective of former errors in departmental assistance and guidance as much as carelessness or malpractices on the part of the grower. May I cite one example.

During the past twenty-five years many districts formerly devoted largely to beef cattle changed over to dairy cattle. With the depressed prices of dairy products in recent years many farmers in both Eastern and Western Canada have purchased an inferior type of beef sire to head their herds of grade dairy cattle. The offspring are finding their way into our beef markets either as low grade feeder cattle or inferior partly finished beef. This product reaching large proportions in Canada probably has a greater influence on overloading the beef market with a low grade product, discouraging consumption of beef in Canada, and discouraging exports, than many other more commonly recognized factors.

Again in our bull purchasing or bull loaning policies our Federal and Provincial Governments should use the power which they obviously have to refuse assistance in clearly defined dairy areas, beef cattle areas, or dual purpose cattle areas, providing the applicant applying for aid chooses a sire detrimental to the best interests of the district.

Surely in addition thereto there should be initiative on the part of professional men to determine what might be best for any community in the region in which they are working. Unfortunately the majority of departmental officials fight shy of definite advice to individual farmers or groups of farmers in this matter. The initiative has been left to a very great extent to the various breed societies and the way in which these have developed their breed in various districts has been responsible to a large degree for successes as well as failures. Unfortunately now we reap the harvest of the failures and some of these are very serious.

I consider it the duty of this Society to make a careful survey within each province and make clear cut recommendations as to the areas best suited to different kinds of live stock production.

Perhaps more as a basis of argument than anything else, I should like to offer the following observations based on the opinion of those whom I consulted in each of the various provinces.

Nova Scotia.—1. *Beef Cattle.*—Areas in the vicinity of marsh land, such as the Amherst, Port Williams and Windsor Forks areas, might well be developed along the lines of commercial beef cattle. The greatest detriment to this development is the tendency to sell hay from the farms, a most profitable undertaking when hay prices are high. Yet the future is certain to be that of cattle production of some sort. In this connection

I would particularly emphasize the value of dual purpose cattle of the very fleshy nature.

2. *Dairy Cattle.*—The opinion of departmental officials is that the balance of the province should consist of dairy cattle. It is my opinion that this is generally correct although there are many areas which cannot depend on the city milk trade and where for creamery purposes dual purpose cattle of a fleshy nature would serve better than existing dairy breeds. Only a careful survey would determine the accuracy of this opinion.

Prince Edward Island.—Generally speaking this province is best suited to dairy production. To the few farmers who because of their forage conditions would prefer beef cattle, I would recommend only a fleshy type of dual purpose cattle.

New Brunswick.—Generally speaking this province is best suited to dairying and this is the opinion of Federal and Provincial officers in that province. Provincial government assistance toward the establishment of modern creameries, which up to the present have not had very profitable returns, has now led to the establishment of cream gathering routes.

Two districts, namely Harvey and Stanley, are noted as Jersey centres. Sussex is noted as an Ayrshire and Holstein centre.

Two areas formerly essentially beef producing districts deserve careful analysis. The counties of Westmoreland and Albert still produce the most of the good quality beef found in the province. These are well suited to beef production because of marsh lands and the production of hay and pasture. Unfortunately the most of the beef produced is of relatively low quality due to a certain mixture of dairy breeding, lack of sufficiently good sires, and other influences. Nevertheless the farmers are beef-minded.

The counties of Carleton and Victoria during the period of maximum certified potato production have neglected live stock which they must now have. Authorities are divided as to whether these should become strictly dairy districts, beef finishing districts, or whether a fleshy type of dual purpose cattle should be produced therein.

Quebec.—This province has become very highly specialized in dairy production, perhaps too highly specialized. Nevertheless there are certain groups of counties in which a fleshy type of dual purpose cattle should be developed. It is suggested that such counties are Megantic, Richmond, Stanstead, Sherbrooke, Compton, part of Arthabasca, Drummond, Wolfe, Frontenac, Brome, Hull and Argenteuil, also certain centres in Lake St. John, Rivière du Loup and Rimouski.

It is suggested that finishing of high class beef cattle in winter might well be developed by certain farmers in the Montreal district who have reasonable areas of land and who are now getting most of their revenue from market gardens on a smaller scale.

Obviously this province should be carefully surveyed from the standpoint of beef finishing, dual purpose cattle production and dairy production.

Ontario.—The problem in this province is not dissimilar to that of Quebec. There are certain defined ranching territories, most of our undeveloped country and a certain portion of the very choicest parts of Old Ontario, where beef raising is traditional, where only beef cattle should be used. On the margins of these areas only high class fleshy dual purpose cattle should be encouraged.

What has already been said regarding the production of low grade beef cattle of mixed breeding certainly applies to many areas in Ontario where formerly high class finished beef or feeder cattle could be bought in large numbers. Even in the past fifteen years well defined beef areas have had an introduction of dairy blood to the detriment of the kind of cattle now available. One thinks of such areas as Manitoulin Island, certain areas in the upper reaches of the Ottawa River and elsewhere.

There is no clearly defined policy for that large area known as the clay belt which has its climatic limitations yet has certain advantages in that it might well be developed into a profitable stopping-off point for store cattle from Western Canada for the economic use of the rich pastures and the valuable leguminous hays which can be grown so easily and profitably in these areas.

Manitoba.—It might be said generally of the three prairie provinces that aside from the ranching areas and the relatively small number of good breeders of beef and dairy cattle elsewhere, Western farmers are not yet livestock-minded. Perhaps this could be better understood when reviewing our production increases over a period of years from 1900 to 1932. During this period wheat production for all Canada increased some 625% while cattle production increased only 43%. However, during this period of 32 years or more, cattle production in Western Canada has increased but because of a lack of clearly defined areas where the best types and breeds might be developed, we find a mixture of breeds, as expressed by one of our members a "breed menagerie."

Saskatchewan.—Areas for live stock production in this province are clearly defined. It is suggested that for grain farmers desiring a few head of cattle, dual purpose cattle of the fleshy type would be ideal. There are a few areas in the vicinities of cities where dairy breeds should be encouraged. The ranching areas of the province obviously must be strictly beef cattle and the balance of the province might well be considered from the standpoint of dual purpose cattle of a fleshy nature irrespective of whether or not creameries are already established and in operation. A complete survey of this province considering the excellent soil and forage survey already conducted should be a relatively simple matter.

Alberta.—Those southern areas, particularly southeast from the Red River at Bassano to the U.S. boundary and all the Foot Hills, are essentially a range beef cattle proposition. Fluid milk areas around the towns and cities would be comparatively few and here only should strictly dairy breeds predominate. For the balance of the province, dual purpose cattle of a fleshy nature certainly should be the standard for production.

British Columbia.—A survey of this province should be relatively easy. The inter-mountain ranching areas are essentially a beef cattle proposition excepting where in certain centres irrigation makes specialized dairying profitable. It has yet to be proven, however, that the cost of irrigation, high as it is, will justify any extensive dairy husbandry since the market is confined largely to creamery products. Southern coastal regions are already highly specialized in dairying and should so remain.

The above remarks intended as a basis for discussion should, however, result in a careful survey based on a survey of feeds and feeding methods and on which in turn should be based breeding and marketing policies. It

is suggested that if a detailed survey were made, the following items might be considered:—

1. *Beef areas:*
   (a) Commercial beef production and finishing.
   (b) Commercial beef production and sales of feeder cattle.
   (c) Areas buying store cattle for finishing.
   (d) Areas which might specialize on baby beef production.
   (e) Areas, if any, where pure bred herds might predominate.
2. *Dairy Cattle Areas:*
   (a) For city milk trade.
   (b) A general dairying programme marketing milk through cheese factories and creameries.
3. *Dual Purpose Cattle Areas:*
   (a) Cows to be milked and calves pail fed.
   (b) Calves to be suckled two per cow and half the herd milked during the summer season.
   (c) Calves suckled and surplus milk home manufactured.

It is suggested that this Society recommend to breed associations and farmers that they thoughtfully study this problem. As soon as a survey is completed per region or province to the satisfaction of the members of this Society, the latter should recommend to Federal and Provincial governments participating in bull loaning or bull purchasing policies that assistance be given only as the breed chosen is in conformity with the best interests of the policy of production in that community. Moreover, at that time it should be recommended to governments that aid in the form of T.B. eradication, subsidies to creameries, or any other financial assistance from public treasuries be given only on the basis of conformity to the proper types of cattle within that area and that should the farmers change their breeding operations in a detrimental manner that all such aids be immediately withdrawn.

I attempted to produce a map of Canada showing in colours the various areas according to the above suggestions. Unfortunately provincial maps showing cultivated and grass areas are as yet not developed to the point where one could make a complete and comprehensive picture for Canada.

MARKETING OF BEEF CATTLE

In view of the fact that this afternoon's programme is devoted to a consideration of the marketing act, I will attempt to make my remarks on this most important topic very brief. Broadly speaking one might say that the most important difficulty in beef cattle at the present time is a price so low as to discourage proper degrees of finish or careful breeding methods. This situation is accentuated further by lack of clear cut rigid policies in breeding. The surplus of beef cattle on our markets could be more than eliminated if inferior cattle were vealed.

Still another factor is that in our dairy industry, diseases of various kinds, including T.B., abortion and mastitis, and other udder trouble cause

an enormous wastage each year, a wastage unfortunately finding its way to our markets as low grade beef or canners, thus still further glutting our markets with low grade products.

The first mentioned problem may be corrected perhaps by a vigorous campaign of an educational nature to induce all farmers with dairy cattle of mixed or dairy breeds to veal all progeny not required for the maintenance of dairy herds or to meet an immediate market for high class dairy cattle. A thorough survey of the quality of cattle on every farm in Canada if apportioned to existing extension services and other technical men working in each of the provinces should not be an insurmountable task and should result in recommendations as to what farmers in different communities should do in this connection.

Undoubtedly the best beef cattle produced in Canada in large numbers come from the Western ranges, as judged from the standpoints of breeding, type, economy of finishing, and health. It is unfortunate that no departments of governments have attempted to take some more arbitrary step to prevent nondescript beef which predominates on many of our markets from lowering the price and value of high class stuff produced on the ranges.

Again referring to bull policies, the question is asked "In connection with these policies which are not for the aid of the high class beef cattle producer on ranch or farm, but for the aid of average farmers who are not working on a clear cut long time policy for their districts, hence with mixed breeding and production resulting, is it not unfair that such policies actually appear to be detrimental to the rancher and high class beef breeder who does not benefit in any way?"

As has been mentioned there is inadequate encouragement for baby beef of a high quality. Our export trade in live cattle prefers grain fed cattle, yet low export values in the past year have often resulted in shippers or speculators getting less money than though they had sold in Canada at that time. The fact remains, however, that from a careful study of the quality of cattle shipped from various districts and a general statement as to the quality of cattle exported, that those cattle exported actually are responsible for maintaining a higher level of prices in Canada than otherwise would have existed, yet the shipper, the feeder, and even the speculator lost money for the benefit of all those who marketed their cattle in Canada of which such a high percentage was inferior.

Whether governments through the marketing act or otherwise should subsidize producers of high class stock for export or whether they should penalize the producers of the bulk of low grade beef largely consumed in Canada are debatable issues. How a clearly defined spread between choice, good, and inferior beef without a guaranteed price being established, can be undertaken is difficult to estimate. Can this best be considered on the basis of compulsory grading of all cattle going through stockyards or for export or compulsory grading of all beef in abattoirs? The beef industry of Canada is in a critical condition.

There is no doubt that the beef grading policy has already done much to educate both breeder, finisher, and consumer, yet it has not established spreads adequate to meet costs. A further consideration of this problem might even suggest a conference of beef producers and dealers in Canada similar to that successful conference of 1929.

Other suggestions which come to mind in the problem of beef marketing which are well known to most of us are as follows:—

1. Adjust the tariff with the United States in order to allow our participation again on that market.

2. Thoroughly explore the problem of chilled meat in Great Britain using as a basis high class finish baby beef in contrast to Argentine chilled beef or Argentine or Australian frozen beef. That a preliminary exhaustive exploration of this is being undertaken by a member of this Society at the present time is worthy of special note.

3. If such a market were developed it might be the means of opening up such problems as a cold storage plant in London to steady the volume of deliveries, the readjustment of ocean rates and rail rates on dressed beef, as well as on live cattle for export.

A suggestion was recently made by a Western Live Stock Association, namely that under the new Marketing Act 100,000 head of inferior cattle be slaughtered, taken off the market and destroyed, the same eventually to be paid for by a levy on cattle of high class as sold. Another suggestion which one hears even more frequently is that there be some means of rigid supervision of export cattle to Great Britain or even eventually to the United States, that this be established as a guarantee of quality of Canadian products and a basis of stimulating production of superior stock.

A statement made by one of the members of this Society strikes me forcefully. This was to the effect that although in his opinion not too much money was being spent in the stimulation of our beef cattle industry, yet too much government assistance was given in the wrong place and did not reach its fullest value in the marketing of our highest class stock and the prevention of production of low grade stock.

Still another member of this Society emphasizes the fact that in so far as British Columbia is concerned, there might be a joint federal-provincial policy created which would develop what might be termed a beef-finishing calendar. As an example, it was recently estimated that 6,500 head would be the total for the season of 1934 to be shipped from Kamloops. Of this number 4,000 would be shipped from June to August, 1,000 in October, and the balance scattered over the months of September, November and December. Since these are largely grass cattle many of which are unfinished, finishing areas in the Lower Fraser Valley might be created which would equalize the supply for the B.C. markets throughout a greater period of the year.

DAIRY MARKETING

Since the marketing of dairy products has received so much careful attention during the past three years and will actively operate no doubt under the Marketing Act, few remarks at this time are needed.

A few suggestions, which perhaps I might enumerate, have been forwarded by members.

Nova Scotia. A local condition of cream gathering with too many trucks per route, largely demanded by the farmers, has raised costs to a marked degree. The alternative would be an attempt to get farmers to co-operate in selling on an organized basis and selling to creameries on tender.

The compulsory adoption of cream grading is suggested not only for this province but others. The 10 to 20% of low grade cream entering into manufacture places Canadian butter and cheese on an unfavourable basis to compete on either domestic or export markets with the product from New Zealand, Australia, Denmark, and elsewhere.

The education of farmers in the voluntary production of more sanitary milk is stressed.

Quebec. One of our members emphasizes the advisability of a thorough study of the introduction of new dairy products to absorb milk surpluses emphasizing the fact that many of these are produced in Europe which are not now produced in Canada. Another suggestion made is that a premium system for the highest quality of butter and cheese for export on a five-year basis be inaugurated.

From many quarters come suggestions regarding the fixing of milk prices for both producer and consumer, but since this with other problems have been subject to many years of experimentation elsewhere and will be thoroughly considered in the application of the Marketing Act, no further comment need be made.

British Columbia.—Perhaps as a result of some of the dairy cattle recently exported as an experimental shipment, there comes the recommendation that the Federal government establish regulations and grading of dairy cattle for export as a safeguard against the occasional thoughtless or unscrupulous speculator who might easily ruin a market so carefully built up by breeders and breed associations.

Several of our members have emphasized the great desirability of continuing a careful survey of the costs of manufacturing dairy products. These have not been systematically studied or an attempt made to lower them to the same extent as with the production of milk, hence a marked influence on the returns to the producer is evident.

BREEDING POLICIES

Many references have already been made to our breeding policies and practices, hence further suggestions on this point will be brief.

It is obvious, however, to many that our assistance to our beef and dairy cattle men in matters of breeding should be placed on regional development which in turn is dependent on existing feeds, potential feeds, and the ability of the farmers as feeders.

It is suggested that before further assistance be given farmers under any of our present bull policies, etc., that a careful survey of the breeds advisable for each community be made.

Also it is wisely suggested that the individual or group receiving such government aid agree definitely to adhere to the defined policy of production for that district.

It is particularly emphasized from the standpoint of dairy cattle that a compulsory vigorous cow testing programme be conducted in every dairy community which receives financial aid from governments either in breeding or manufacturing policies.

It is suggested that in dairy communities an attempt be made to induce breed associations to agree on certain clearly defined communities, counties

or even larger areas, in which not more than two breeds—preferably but one—be promoted by them. In other words that an attempt be made to get real co-operation amongst breed associations in the defining of breed areas.

I would suggest that every member of this Society attempt to induce all others interested in putting on an educational campaign toward the preservation and use of *proven sires*. We have been preaching this doctrine in a half-hearted way for thirty years, yet to but little effect. In reality the only stumbling block is the fear of the individual farmer in handling old, strange or dangerous bulls. I have with me a blue print of a very simple safety bull pen and yard in which the attendant at no time has to handle the bull since the pen may be cleaned out by the closing of a door, cows may be bred in the yard corner using the swing gate, or the yard may be cleaned out by shutting the bull in the pen. We are maintaining aged bulls in a perfectly healthy condition at very low cost in such equipment. Actually there is no real reason why every farmer whose herd justifies bull ownership could not at little or no cost provide quarters of this kind. It is possible that some of our provincial governments which may be flush in money might even offer some small financial assistance toward the construction of such equipment as an extra inducement to the farmer to use proven sires in preference to untried younger animals often purchased at a much higher price but of speculative value.

The identification of proven sires in either beef or dairy cattle has not however, been developed by departments, as should be done. We know this from experience for we have been on the market for a dozen or more bulls of different breeds during the past few months and have discovered that even in those breed associations which have most active and efficient extension services, there is no attempt to continuously survey, list and preserve proven sires. This is a matter which should be actively drawn to the attention of breed associations.

I have no comments to make regarding existing bull loaning policies or provincial bull purchasing policies. I believe in the principle, however, that where there is a large live stock population on a farm or ranch, private ownership of bulls should be insisted upon but that in some manner the owner should be encouraged financially to a degree the equivalent of aid given to owners of small herds now benefiting by existing policies.

In measuring the value of sires in dairy and beef cattle a *progeny test* of some sort must be established. This would involve grading of bull progeny, grading of daughter progeny retained for breeding purposes, and the grading of steer progeny through the markets. How much might be established without a heavy tax on government resources would require study, but the urgent need for a standard of measurement in proven beef sires is great, and the failure of show rings to do this on a nation wide scale is well recognized.

The measurement of values of dairy bulls with existing machinery is simple. Our existing R.O.P. and Advanced Registry policies will have an enormous effect on improvement of dairy cattle and the appreciation of good pure bred sires. Probably we have not yet started to reap the greatest harvest from the excellent work of the past few years. Nevertheless a progeny test of advanced registry bulls seems to be the next step forward

in sorting out these blood lines and sires on which we may build a real breeding programme.

Under our new Marketing Act or through the coercive influence of present bonuses, compensations and the like, more active, vigorous and continuous measures should be taken to eliminate the *scrub bull* and to *eliminate boarders* in our beef and dairy herds. Any such action should be followed by even more rigid restrictions against the rearing of such animals to still further destroy our beef market.

Have we in Canada not about reached the stage of development where *registration* practices should be altered? It is too easy and too cheap to register cull animals during the boom times. During periods of depression we suffer doubly from the propagation and recognition of such culls. It may cost more to the pure bred breeder but should almost immediately react to this benefit in the added discrimination in favour of superior stock, if we adopted practices so well established in many of the cattle breeding countries of the world, namely the identification of the pure bred calf by a tattoo or some other method and inspective and selective registration one to two years later.

Have we not reached the period when registration of dairy cattle should be based on type plus an official record of production? You will remember that the Dairy Advisory Committee under the Live Stock Commissioner carefully considered this matter in the report of their meeting in 1927.

It is obvious that further and more concerted action should be taken toward the development of community breeding clubs and improved sire areas. Almost every province now offers excellent examples of the splendid improvement that can be made by concerted effort along these lines. There is probably no better time than the present to attempt to influence the farmers to systematically cull low grade stock, for although the price for culled cattle is very low, yet feed costs especially in areas where there is feed shortage, should largely assist in getting immediate results.

It is suggested that the provincial and federal departments actively tackle this problem in whatever influence they may have on farmers through personal contacts or otherwise.

Although it appears to be a minor factor, yet speaking as an animal husbandman I am convinced that if the average farmer could be induced to keep careful breeding records of pure bred sires or females, if any, and of grade cattle in his herd, he would have a clearer knowledge of the animals themselves, which in turn would be the greatest stimulation and education toward improving the breeding practices in rigid culling of undesirable animals and better feeding and marketing practices.

Only one of our members has so far emphasized the great desirability of developing hardier and more vigorous cattle to meet Canadian and particularly Western conditions. That this should be the basis of careful study by members of this Society before any suggestions be made in reference to registration, advanced registry, or other forms of organization, is quite apparent and I leave this thought with every animal husbandman in Canada. We have all seen the craze for pedigrees or known high production influence ourselves and fellow breeders in the purchasing or retaining of breeding stock with the realization, however, that longevity and economy

of production over a number of years were perhaps doubtful due to the external evidence of lack of vigor. Surely we have reached the point where we should not countenance any pedigree without every evidence of vigor and health.

Finally I beg to leave this thought with the members of this group, namely that it should be our responsibility in co-operation with breed associations and departments to discourage the idea of making every farmer a pure bred breeder, but rather we should attempt to carefully study all farmers with whom we come in contact and who are the owners of pure bred sires or females, to sort out the few who may indicate an evidence of becoming constructive breeders.

HEALTH OF CATTLE

This matter has been already referred to and it is, I believe, admitted by all that in the broad programme of animal health, governments must assume the lead. There is no doubt that our existing problems justify our keenest support to an even more vigorous programme of research as a means of detecting and eliminating animal diseases and parasites. More exhaustive surveys of our herds throughout Canada from the health standpoint would without doubt result in a solution of many of our production and marketing problems. Eradication of diseases for which we have already diagnostic measures is an enormous problem. As one studies the live stock map of Canada from the standpoint of T.B. eradication as shown by the Health of Animals Branch at the Royal Winter Fair, one is amazed at the still all too small percentage of our cattle which may be claimed to be free from this disease. Even in these areas the high percentage of avian T.B. found in poultry flocks and the same type of organism found in our swine herds, shows the enormity of this problem. Then if one notes the millions of dollars already expended on this eradication programme with cattle alone, one questions how far such a policy may go at the expense of the taxpayers in Canada.

Nevertheless from the standpoint of export trade and human health the completion of such a programme would seem highly advisable. Should such a programme henceforth be confined essentially to dairy cattle areas producing milk for fluid consumption? Should compensation be reduced gradually to the disappearing point and the breeder made to carry the full burden?

Again we have two other diseases carrying enormous loss in our cattle. It is claimed by an excellent authority in the province of Quebec that mastitis in dairy cattle is causing greater loss in production than T.B. It is generally recognized by all who have a broad knowledge of our cattle industry that contagious abortion has for years caused greater losses than T.B.

It would appear impossible for the taxpayers of Canada to support an eradication campaign against these diseases based on heavy compensations. On the other hand, there have been excellent demonstrations as to the most economical means of gradually eliminating these diseases from the herd and certain limited services are already rendered by the Federal Government and others toward diagnosing contagious abortion, and all this is forming a ground work of education for some more vigorous policy.

Would not the policy of encouraging a greater number of practising veterinarians in every community to thoroughly train and equip themselves for a Dominion-wide programme of diagnosis and control in commercial herds even though they receive partial salary from Federal and Provincial governments for the work done, while the owners stand full loss of animals identified as diseased and a menace to their herd and public health, be about as much as we might expect the public coffers to contribute? What part we as a Society may be identified with in such a programme of education and development is problematical, yet this is but a fair example of how closely we are bound up with the problems of animal health, though we be interested primarily in feeding, breeding or marketing work.

OTHER FACTORS

I have already far exceeded the space in this programme which I deserved, hence will but mention a few of many other factors which should enter into the future development of our live stock industry.

Distribution Policies.—There are many past and present distribution policies for the assistance of districts to become established in breeding cattle and a few of these are operated at the present time. Whether or not such assistance is given based on a clear cut objective for those districts is doubtful.

There have been and are certain assistances given by departments to the distribution of cattle from stock yards to the feed lot. Is it perhaps illogical that such assistance given from stock yards should not be given equally from any other large centre where live stock may be selected, such as the ranches. There is little or no assistance given toward the distribution of feed to the live stock areas excepting to meet the emergencies of some drought stricken areas. Nevertheless, as already mentioned a well developed policy for the distribution of grains from centres which must always be grain-producing specialized areas to the centre of live stock populations would be a most worth while and constructive policy.

We repeatedly hear vigorous and even frenzied arguments as to the development of larger and more continuous movement of Western range cattle to Ontario feed lots, a policy sound in itself providing freight rates and other costs are not prohibitive. A systematic study of the principles involved and an attempt to work out a policy of sliding scale freight rates based on the value of the finished beef, has to my knowledge not yet been attempted.

These are just a few of the distribution problems both for the domestic and our export trade of live cattle and dressed beef to the markets of Great Britain or what may be our markets in the United States or elsewhere, which deserve the most thoughtful study of a group of members in this Society if the Society is to offer a continuous source of reliable opinion to our departments and governments.

Credits.—Ranchers and farmers during these times realize how little cattle either beef or dairy are considered collateral as a basis for credit in their operations. Are we as a Society studying this problem of finances in our industry? Is it not deserving of an active committee working in the closest co-operation with financial experts?

Exhibitions.—Probably no one problem gives greater concern to our live stock commissioners throughout Canada than that of our exhibitions. That they have performed an enormously beneficial task of demonstrating and even introducing better breeding stock in the communities is without doubt. That they also have been responsible for distributing disease, setting false standards, failing to conform to commercial requirements and the like we all must recognize. Nevertheless, exhibitions large and small form one of our best sources of education and contact amongst live stock men. That many of the provincial governments because of financial stress have ceased to give financial aid of any sort to smaller fairs is regrettable. That many of our wealthier provinces are continuing to give aid without a clearly defined policy as to the sphere of usefulness, the classifications, and the clientele served, is perhaps equally regrettable. That there should be a very clear cut understanding between federal and provincial governments based on a sound policy of relationship between Class A, Class B and county or township fairs appears to me to be logical.

It seems to me that here again our Society, both Eastern and Western sections, might be of distinct aid to live stock commissioners throughout Canada in defining the policies regarding the sphere of activity and the needs for and benefits from government grants to exhibitions.

I have refrained from any attempt to quote statistics which I have gathered in this connection. These I append hereto for a handy reference although none of these are entirely new.

In closing my remarks I am not attempting to recapitulate on suggestions made. I offer the above as a basis for discussion with the sincere conviction that although many of these suggestions seem to be hasty reviews yet all are in my opinion worthy of some discussion at this meeting, and an attempt should be made to organize this branch of our technical agriculturists into study bodies which may evolve plans to aid the farmers and others who constitute the industry, as well as government departments of which most of us are members and whose one ambition it is to serve the cattle industry on which the future prosperity of Canada so largely depends.

86441—2½

APPENDIX I.—Dairy and beef cattle in Canada showing by provinces the numbers and classes of cattle within each group and the total numbers of all cattle, June Survey, 1933

Province	Dairy Cattle			Beef cattle				Unclassified		All cattle
	Cows for milk	Yearlings for milk	Total	Cows for beef	Yearlings for beef	Steers	Total	Bulls	Calves	
Prince Edward Island	46,000	11,800	57,800	5,900	3,700	10,100	19,700	3,200	24,800	105,500
Nova Scotia	119,600	28,200	147,800	9,200	6,200	27,800	43,200	5,500	46,600	246,100
New Brunswick	110,500	28,400	138,900	8,900	4,900	18,700	32,500	10,100	55,100	236,600
Quebec	952,500	225,200	1,177,700	60,809	29,100	60,700	150,600	80,600	351,100	1,760,000
Ontario	1,183,200	251,800	1,435,000	69,900	249,800	133,500	453,200	62,000	573,600	2,523,800
Manitoba	363,900	109,400	473,300	*	†	100,400	100,400	20,700	211,400	805,900
Saskatchewan	480,400	141,100	621,500	137,400	59,300	181,600	378,300	38,300	408,000	1,446,100
Alberta	406,500	118,200	524,700	226,700	78,200	214,100	519,000	32,900	395,200	1,471,800
British Columbia	90,800	22,600	113,400	55,500	17,100	31,800	104,400	6,600	55,800	280,200
CANADA	3,753,400	936,700	4,690,100	*574,300	†448,300	778,700	1,801,300	259,900	2,124,600	8,876,000

*Included with cows for milk in Manitoba.
†Included with yearlings for milk in Manitoba.

Table Prepared by Dominion Bureau of Statistics.

APPENDIX II. TABLE ID.—TOTAL DAIRY PRODUCTION OF CANADA EXPRESSED IN POUNDS OF MILK, 1933

Province	Total milk production lb.	Made into butter		Made into cheese		Miscellaneous factory products lb.	Whole milk otherwise used lb.
		Dairy lb.	Creamery lb.	Home-made lb.	Factory lb.		
Prince Edward Island.	157,371,900	45,649,000	48,888,500	3,400	6,309,000	331,000	56,191,000
Nova Scotia	473,777,800	140,460,000	142,515,800	448,000	—	13,277,000	177,077,000
New Brunswick	421,262,300	174,544,000	66,272,300	67,000	3,528,000	2,636,000	174,215,000
Quebec	4,218,981,000	332,351,000	1,531,599,000	2,800,000	284,760,000	17,968,000	2,049,503,000
Ontario	6,343,577,900	736,396,000	1,767,180,800	1,478,000	897,857,100	135,904,000	2,804,762,000
Manitoba	1,116,507,500	215,957,000	457,845,500	1,120,000	9,570,000	6,229,000	425,786,000
Saskatchewan	1,456,818,100	503,315,000	452,247,100	1,568,000	8,400,000	4,487,000	486,801,000
Alberta	1,346,402,500	292,625,000	555,987,500	2,800,000	16,072,000	5,908,000	473,010,000
British Columbia	490,132,000	51,502,000	117,816,500	281,000	6,611,500	36,696,000	277,225,000
CANADA, 1933	16,024,831,000	2,492,799,000	5,140,353,000	10,565,400	1,233,107,600	223,436,000	6,924,570,000
1932	15,917,868,000	2,503,381,000	5,009,790,000	11,503,400	1,349,872,000	219,571,000	6,823,751,000
1931	15,772,852,000	2,418,488,000	5,289,612,000	10,095,000	1,276,315,000	252,532,000	6,525,810,000
1930	15,126,459,000	2,283,152,000	4,348,431,000	9,115,000	1,333,977,000	312,800,000	6,838,984,000

Table Prepared by Dominion Bureau of Statistics.

APPENDIX III.—TABLE 11D.—PRODUCTION OF BUTTER AND CHEESE BY PROVINCES, 1933

Province	Dairy butter lb.	Creamery butter lb	Total butter lb.	Home-made cheese lb.	Factory cheese lb.	Total cheese lb.
Prince Edward Island	1,950,000	2,088,400	4,038,400	300	563,300	563,600
Nova Scotia	6,000,000	6,087,800	12,087,800	40,000	—	40,000
New Brunswick	7,456,000	2,830,900	10,286,900	6,000	315,000	321,000
Quebec	14,197,000	63,251,000	77,448,000	250,000	25,425,000	25,675,000
Ontario	31,457,000	75,488,300	106,945,300	132,000	80,165,800	80,297,800
Manitoba	9,225,000	19,557,700	28,782,700	100,000	854,500	954,500
Saskatchewan	21,500,000	19,318,500	40,818,500	140,000	750,000	890,000
Alberta	12,500,000	23,750,000	36,250,000	250,000	1,435,000	1,685,000
British Columbia	2,200,000	5,032,700	7,232,700	25,000	590,300	615,300
CANADA, 1933	106,485,000	217,405,300	323,890,300	943,300	110,098,900	111,042,200
1932	106,936,400	214,002,127	320,938,527	1,027,100	120,524,243	121,551,343
1931	103,310,000	225,955,246	329,265,246	901,300	113,956,639	114,857,939
1930	97,529,000	185,751,061	283,280,061	813,000	119,105,203	119,918,203

Table Prepared by Dominion Bureau of Statistics.

APPENDIX IV.—TABLE VID.—VALUE OF DAIRY PRODUCTION OF CANADA BY PROVINCES, 1933

Province	Dairy butter $	Creamery butter $	Home-made cheese $	Factory cheese $	Miscellaneous factory products $	Milk otherwise used $	All products* $
Prince Edward Island	332,000	428,100	21	50,700	32,700	508,000	1,487,521
Nova Scotia	1,380,000	1,339,300	3,000	—	641,000	1,172,000	4,941,300
New Brunswick	1,342,000	594,500	1,000	31,500	198,500	1,804,000	4,317,500
Quebec	2,484,000	12,397,200	25,000	2,466,200	1,792,000	22,301,000	43,193,400
Ontario	4,970,000	15,475,100	12,000	7,214,900	6,704,500	33,833,000	70,606,500
Manitoba	1,292,000	3,618,200	10,000	90,000	479,900	4,661,000	10,796,100
Saskatchewan	2,795,000	3,573,900	15,000	82,500	492,700	4,439,000	12,313,100
Alberta	1,687,000	4,156,300	23,000	155,000	421,200	5,571,000	12,723,500
British Columbia	341,000	1,158,000	5,000	82,600	1,633,800	3,727,000	7,109,400
Canada, 1933	16,623,000	42,740,600	94,021	10,173,400	12,396,300	78,016,000	167,488,321
1932	15,311,000	40,475,479	94,120	11,379,922	13,112,612	71,627,000	159,074,133
1931	21,450,000	50,198,878	108,500	12,824,695	16,550,619	78,876,000	191,389,692
1930	27,385,000	56,670,504	115,555	18,089,870	21,074,228	101,230,000	237,068,157

*The data in this column include the value of skim milk and buttermilk. For all Canada this was $7,445,000 in 1933, as compared with $7,074,000 in 1932, $11,381,000 in 1931 and $12,503,000 in 1930.

Table Prepared by Dominion Bureau of Statistics.

APPENDIX V.—Domestic rates on grain and grain products (per 100 lb.)
(Supplied by board of railway commissioners)

From Fort William to	1930			
	All rail c.	Lake and rail c.	All rail c.	Lake and rail c.
Montreal and points west thereof	37½	32½	25	20
Quebec	37½	37½	25	25
St. John.	55½	50½	40	35
Halifax	57	52	42	37
Toronto	37½	32½	25	20
Moncton	55½	50½	(a) 40	35
Truro	57	52	42	37
Fredericton	55½	50½	(a) 40	35
Sherbrooke	45	40	(b) 29	24
Charlottetown	57	52	(c) 42	37

(a) Expires end present month. If not renewed will go back to .45c. and .40c.
(b) Expires end present month. If not renewed will go back to .36. and .31c.
(c) Expires end present month. If not renewed will go back to .47c. and .42c.

From points west of Fort William add common rates to Fort William to the above.

There was some movement in coarse grains and grain products for domestic consumption in 1931 from Fort William to Halifax, Charlottetown, Yarmouth, St. John and other Eastern points by steamers used to transport sugar from St. John to the head of the Lakes. The rates were 17c. to Quebec City and west thereof, and 22c. to St. John, Halifax, Charlottetown, etc. It is understood that this business has increased. Further information is being obtained from the Halifax Harbour Commissioners.

April 18, 1934.

APPENDIX VI.—Export rates on grain and grain products
All Rail (per 100 lb.) (Supplied by the Board of Railway Commissioners)

From Fort William to	Wheat		Other grains		Flour and grain products	
	1930 c.	Present rate c.	1930 c.	Present rate c.	1930 c.	Present rate c.
Montreal and Quebec	34½	34½	33	33	35½	35½
	(Probably no movement under above rates)					
St. John and Halifax	35½	25	34	Barley and oats .25 Other grains .34	36½	Wheat flour .25 Other flour .36½ Oat and wheat products .26 Other grain products .37½
	LAKE AND RAIL					
Montreal	25	18	25	18	25	18
Quebec	27	21	27	21	Flour .26 Other grain products .27	21
St. John and Halifax	27	21	27	21	Flour .26 Other grain products .27	Flour .20 Other grain products .21
	(present rates extended to Nov. 17, 1934)					

April 18, 1934.

APPENDIX VII.—Creameries, cheese factories and meat packing establishments in Canada, by provinces, 1932

Province	Creameries	Cheese factories	Combined cheese and butter factories	Total butter and cheese factories	Meat packing establishments
Prince Edward Island	22	13	2	37	
Nova Scotia	30	–	–	30	16
New Brunswick	23	11	–	34	
Quebec	644	432	269	1,345	36
Ontario	263	683	38	987	57
Manitoba	54	13	2	69	7
Saskatchewan	59	7	1	67	6
Alberta	91	8	4	103	7
British Columbia	33	2	1	36	12
CANADA	1,219	1,172	317	2,708	141

Table Prepared by Dominion Bureau of Statistics.

APPENDIX VIII.—Summarized statement branded beef sold during the years, 1931, 1932 and 1933

Sales by Provinces

		Red lb.	Blue lb.	Total lb.
British Columbia	1931	1,417,617	182,744	1,600,361
	1932	1,754,319	359,695	2,114,014
	1933	2,178,250	423,495	2,601,745
Alberta	1931	473,236	1,183,470	1,656,706
	1932	629,611	1,773,206	2,402,817
	1933	984,321	2,213,766	3,198,087
Saskatchewan	1931	209,701	1,283,315	1,493,016
	1932	157,641	1,679,350	1,836,991
	1933	169,587	2,394,333	2,563,920
Manitoba	1931	560,541	2,031,600	2,592,141
	1932	985,132	1,963,056	2,948,188
	1933	1,005,195	3,169,261	4,174,456
Ontario	1931	2,474,502	4,633,816	7,108,318
	1932	2,751,913	4,906,716	7,658,629
	1933	3,855,182	9,443,954	13,299,136
Quebec	1931	1,210,961	1,579,245	2,790,206
	1932	1,256,265	3,531,864	4,788,129
	1933	1,693,100	3,152,165	4,845,265
ALL CANADA	1931	6,346,558	10,894,190	17,240,748
	1932	7,534,881	14,213,887	21,748,768
	1933	9,885,635	20,796,974	30,682,609

APPENDIX VIII.—SUMMARIZED STATEMENT BRANDED BEEF SOLD DURING THE YEARS, 1931, 1932 and 1933—*Concluded*

Sales by Months

	Red 1931	Blue 1932	Total 1933
	lb.	lb.	lb.
January	866,466	1,448,859	1,941,476
February	983,571	1,549,558	2,299,968
March	*1,199,357	†2,230,104	3,221,736
April	†1,983,022	*1,818,844	2,704,335
May	1,798,265	1,862,834	2,754,678
June	1,863,168	*1,873,354	†3,183,433
July	1,939,171	†2,080,472	*2,203,290
August	1,232,644	*1,420,278	2,666,249
September	1,336,617	†1,895,696	*2,268,707
October	1,305,252	1,615,389	2,310,955
November	1,171,797	*1,748,481	†2,780,187
December	1,561,438	†2,204,899	*2,347,595
	17,240,748	21,748,768	30,682,609

*— Change from a four- to a five-week month.

†— Change from a five- to a four-week month

APPENDIX IX

NUMBERS OF DIFFERENT CLASSES OF CATTLE EXPORTED FROM CANADA DURING THE FISCAL YEAR ENDING MARCH 31, 1934

Beef cattle over 1 year old	57,573
1 year old or less	976
For dairy purposes	2,710
For improvement of stock	2,950
	64,209

Table Prepared by Dominion Bureau of Statistics.

EXPORTS ACCORDING TO THE PROVINCE FROM WHICH THE CATTLE WERE EXPORTED AND IN WHICH THEY WERE FINISHED

Alberta	10,488
Saskatchewan	4,515
Manitoba	4,431
Ontario	31,783
Quebec	1,714
New Brunswick	75
	53,006

N.B.—Exports to the United States in 1932 show as 2,634 dairy cattle, these mostly from Ontario, and 3,052 other cattle. Exports to other countries included 170 dairy cattle and 2,985 other cattle.

Table Prepared by Live Stock Branch, Ottawa.

REPORT ON EXPERIMENTAL SHIPMENT OF CHILLED BEEF TO BRITAIN[1]

A. M. Shaw[2]

University of Saskatchewan, Saskatoon, Sask.

[Received for publication October 1, 1934]

For the past two years, the calf crop from the experimental herd kept on the Matador Ranch has been shipped to Britain alive and marketed as baby beef. In both 1932 and 1933 these consignments commanded the highest price paid for any cattle sold on the Birkenhead market during the second week of July, the price in 1932 being $9\frac{3}{4}$d. per pound (in sink)[3] and in 1933, $7\frac{1}{2}$d. per pound (in sink).

A number of the carcasses of these animals in both 1932 and 1933 were forwarded to London and marketed in the Smithfield market where they readily sold at the same price as fresh killed English and Scotch beef. A quotation from a letter from one of the largest handlers of fresh killed beef in the Smithfield market indicates how this type of Canadian baby beef was received by the trade:—

"We would sum up our comments on this baby beef by saying that, in our opinion, as one of the largest handlers of Scotch beef in Smithfield, this beef has found more favour with our customers than any yet in our experience and, if the product can be organized to keep up a consistent supply, a reputation could speedily be built up for it in Smithfield that would permit of its commanding a price parallel with the choicest of our home products."

Because of this ready acceptance of fresh killed Canadian baby beef carcasses on the Smithfield market together with the well recognized fact that the heavy transportation costs involved in the shipping of live cattle from Western Canada were a limiting factor in the net returns, it was decided to make a trial shipment of chilled beef direct to London in 1934. The experiment was arranged as follows:—

1. One carload consisting of 26 head was shipped from Saskatoon alive via rail and ocean transport to Birkenhead where they were to be sold in the usual manner (in sink). Some of the carcasses were to be forwarded to London for comparison with the chilled carcasses from Montreal and Saskatoon.

2. One carload consisting of 26 head was shipped from Saskatoon via rail to Montreal where they were slaughtered, the carcasses chilled and forwarded via ocean refrigerator service to London to be sold on the Smithfield market.

3. One carload consisting of 25 head was slaughtered in Saskatoon, the carcasses chilled and forwarded by refrigerator car service to Montreal, then by ocean refrigerator service to London to be sold on the Smithfield market.

[1] Undertaken by the University of Saskatchewan in co-operation with the Provincial Department of Agriculture.

[2] Dean of Agriculture, University of Saskatchewan.

[3] The term "in sink" is used in the British cattle markets to indicate that the animals are purchased alive, but paid for at so much per pound dressed weight. The offal is thrown out.

All three shipments were timed so that the chilled beef from Saskatoon and Montreal, as well as the fresh killed carcasses from Birkenhead, would reach the Smithfield market at the same time and be exposed for sale in the same stall on the same day in order that a careful comparison might be made. The comparison was not limited to the meat but included every item of cost involved in connection with all three methods of shipment and marketing.

In order to avoid if possible the problem of condensation which is invariably present when frozen or semi-frozen meat is removed from low temperatures and exposed for sale, it was decided to attempt to carry the carcasses at a point just above freezing, viz., 32° to 33° Fahrenheit. It was found to be impossible to carry out this plan owing to two practical difficulties.

First: on account of there being no means of circulating the air in the refrigerator cars, cooled by natural ice and salt, the inside temperature varies at different points. If an attempt were made to carry meat in sides at an average temperature of 32° F., the lower part of the sides hanging next to the ice bunkers would actually be in a temperature several degrees lower or considerably below the freezing point. To avoid this danger, it was necessary to accept a higher average temperature, one which actually ranged from 34° to 40° F.

Second: the ships have no regular range of temperatures in use between 32° and 35° F. It is quite possible for them to maintain any temperature desired, but to secure this, it was necessary to contract for an entire compartment. This was impossible owing to excessive costs involved, again making it necessary to accept the accommodation offered, viz., a 'tween deck chamber held at 35° to 40° F.

On June 20, twenty-five head were killed in Saskatoon, half of the sides being shrouded, the balance left in the natural state. The carcasses were pre-cooled for 48 hours at a temperature of 33° F. to 34° F., then wrapped in stockinette and burlap, loaded into a refrigerator car and held at a temperature which varies from 34° to 40°., until reaching Montreal, where they were loaded along with the 26 carcasses that had been prepared and handled in exactly the same manner with regard to slaughtering, shrouding, pre-cooling and wrapping at that point. The temperature of both the Saskatoon and Montreal killed carcasses at the end of the 48-hour pre-cooling period was the same, viz., 35° F., at centre of hind quarter and 34° F. at centre of shoulder.

The transfer from the refrigerator car and from the abattoir at Montreal to the ship was made on the afternoon of June 28. In the freight sheds where the transfer was made, the temperature of the air, which was very humid, was 85° F. The meat was exposed to this temperature during the time it was being stored—about an hour in all. The Saskatoon shipment arrived at Montreal in perfect condition and the whole consignment was satisfactorily hung in one of the 'tween deck chambers on board ship. The chamber used also contained a large quantity of bacon.

The ship sailed on June 29, and arrived at the Surrey Docks, London, about midnight on Sunday, July 8, too late to have the meat ready for the Monday morning market. As comparatively little business is done on Tuesday at Smithfield, it was decided to hold the beef for the Wednesday

and Thursday markets. July 9 was another extremely hot day, the humidity was high and the temperature on the docks registered 85° F. As soon as the hatch was opened up, a thorough inspection of the beef was made. Several sides were unwrapped and tested. The entire consignment was found to be in fairly good condition, no molds were in evidence, and the sides appeared dry and a good colour. The only evidence of deterioration was a very faint odor of "sourness" or "bone taint", which could be detected on some of the sides.

During the whole of Monday forenoon while the bacon, which was in the same chamber, was being unloaded, the hatch, of course, was open and, although the ship's engineers kept the refrigeration system working, the temperature was greatly raised. At noon, the hatches were sealed and not again opened until Tuesday at 4 p.m., when one-half of the shipment was removed and sent to the stalls in Smithfield market where it hung until the market opened at about 4 a.m. on Wednesday, July 11. The balance was brought out on Wednesday afternoon and sold early on Thursday morning, July 12.

By this time, "sourness" or "bone taint" that had only been slightly noticeable on some of the sides when inspected and tested on arrival, July 9, had increased to an extent that greatly lowered the price secured for the meat. None of it was condemned, the Government inspectors who inspect all imported meats simply specified that the large bones be removed from some of the hind and fore quarters before offering for sale. These instructions were carried out and the entire consignment finally sold.

The shipment of live cattle which had meanwhile reached Birkenhead landed in good condition. Sixteen of them again sold for the top of the market at 8d. per pound (in sink), the carcasses of the other ten head being forwarded to London where they were exposed for sale in the same stall with the chilled carcasses from Saskatoon and Montreal on July 11. They were readily sold at the same price as was being paid for fresh killed English and Scotch beef of similar quality, viz., 5/4 per stone of eight pounds or 8d. per pound.

These fresh killed sides were, of course, in perfect condition, but the difference in appearance between them and the chilled sides was not as great as might be expected. The latter had lost some of the bloom which is present in fresh killed meats and also was slightly drier and darker in colour. In comparing the Canadian chilled sides with fresh killed Canadian beef, and also with Scotch and English fresh killed beef, it was found that there was much less difference in actual appearance than there was between it and the frozen and semi-frozen beef of other countries.

The offal from 13 head killed in Montreal was prepared and shipped at a temperature of 20° F. in order to compare the price obtained with that secured for the offal from the other 13 head which was disposed of in Montreal. It arrived in perfect condition and fetched 63c. net per steer more than an equivalent amount sold in Montreal.

In support of this finding and also keeping in mind that this particular shipment was not in prime condition when sold and therefore could not be used as a basis, the following quotation is submitted from a statement given by the Smithfield firm that handled the shipment:—

"Had this meat arrived in perfectly sound condition, the sides would have made from 4/- to 4/4d. per stone of eight pounds (6d. to 6½d. per lb.),

and considering that on the same day Argentine chilled sides in perfectly sound condition made 2/6d. to 3/- per stone ($3\frac{3}{4}$d. per lb.), the comparison is very favourable to the Canadian chilled sides."

The following detailed statements covering each method of shipment indicate clearly the costs involved. In statements No. 2 and No. 3, the price per pound is that indicated in the quotation, which appears in the preceding paragraph, viz., $6\frac{1}{2}$d. per pound.

STATEMENT No. 1

RECEIPTS FROM 800 LB. STEER SHIPPED ALIVE FROM SASKATOON, SASK., TO BIRKENHEAD, ENGLAND[1]

Rail freight Saskatoon to Montreal at $1.12\frac{1}{2}$ per 100 lbs.	$ 9.00		
Feed in transit	1.00		
Feed in Montreal, yardage, etc.	1.00	Sale of 440 lbs. beef.	
Ocean freight	10.80	in sink at 8d.	$73.33
Ocean feed and bedding (feed supplied Montreal less surplus). Sold Birkenhead	3.00		
Ropes, pails, etc.	.40		
Wages	.50		
Shipping Master	.05		
Tagging	.05		
Insurance on attendants	.05		
Marine insurance on cattle at 50c. per $100 on $80	.40		
Handling (Broker's charge)	.50		
Birkenhead Charges—			
Government inspection at 5d. per head	.10		
Droving at 2/6 per head	.60		
Keep	1.00		
Gifts at 1/- per head	.25		
Birkenhead charges	1.00		
Dock dues	.20		
Insurance at 9d. per head	.18		
Commission	2.00		
	$32.80		
Balance	40.53		
	$73.33		$73.33

[1] In this and the following statements the exchange rate is £1=$5.00.

STATEMENT No. 2

RECEIPTS FROM 800 LB. STEER SHIPPED ALIVE FROM SASKATOON, SASK., TO MONTREAL, QUE., THERE SLAUGHTERED AND SHIPPED CHILLED TO SMITHFIELD, LONDON, ENGLAND

Rail freight Saskatoon to Montreal at $1.12\frac{1}{2}$ per 100 lbs.	$ 9.00	Sale at Smithfield of 440 lbs. dressed	
Feed in transit	1.00	beef at $6\frac{1}{2}$d. per lb.	$57.29
Feed at Montreal	.50	Sale of offal and hide	
Killing charges	1.25	(Montreal)	3.57
Wrapping	1.00		
Weighing and insurance	.08		
Ocean freight at $1.60 per 100 lbs. on 440	7.04		
Marine insurance at 6c. per 100	.03		
London Charges—			
Quay rates at 10/- per English ton less 10%	.45		
Port rates at 2/- per English ton less $7\frac{1}{2}$%	.09		
Haulage, Surrey docks to Smithfield at 2/6 per carcass	.60		
Tolls to corporation at 2/3 per English ton	.12		
Unloading charges at 1/- per carcass	.25		
Selling commission at 2d. per stone of 8 lbs.	2.30		
	$23.71		
Balance	37.15		
	$60.86		$60.86

STATEMENT No. 3

RECEIPTS FROM 800 LB. STEER KILLED AT SASKATOON, SASK., AND SHIPPED CHILLED TO SMITHFIELD, LONDON

Local freight	$ 0.50	Sale at Smithfield of 440 lbs. dressed beef at 6¼d. per lb.	$57.29
Killing charge	2.00		
Wrapping	3.00		
Rail freight Saskatoon to Montreal at $1.49 per 100 lbs. on 445 lbs.	6.63	Sale of offal and hides, Saskatoon	3.13
Ice charges (approx.)	2.00		
Ocean freight at $1.60 per 100 lbs. on 440 lbs.	7.04		
Marine insurance at 6c. per 100	.03		
London Charges—			
Quay rates at 10/- per English ton less 10%	.45		
Port rates at 2/- per English ton less 7½%	.09		
Haulage, Surrey docks to Smithfield at 2/6 per carcass	.60		
Tolls to corporation at 2/3 per English ton	.12		
Unloading charges at 1/- per carcass	.25		
Selling commission at 2d. per stone of 8 lbs.	2.30		
	$25.01		
Balance	35.41		
	$60.42		$60.42

STATEMENT No. 4

COMPARISON OF RECEIPTS FROM SALES OF OFFAL FRESH AT MONTREAL AND FROZEN AT SMITHFIELD, ENGLAND (ONE STEER)

	Montreal			Smithfield		
	Weight	Rate per lb.	Amount	Weight	Rate per lb.	Amount
	lbs.			lbs.		
Liver	7	$0.07	$0.49	7	$0.12	$0.84
Tongue (trimmed)	3	.10	.30	5 (untrimmed)	.16	.80
Heart	2¾	.03½	.10	2¾	.04	.11
Tail	—	—	—	—	—	.02
Hide	45	.05	2.25	45	.08	3.60
			$3.14			$5.37
				Less ocean freight and expenses in England		.35
						$5.02

SUMMARY OF STATEMENTS 1, 2 AND 3 (ONE 800 LB. STEER)

Killed at	Canadian expenses	Ocean expenses	English expenses	Total	Gross receipts	Net receipts
Birkenhead, England	$11.00	$15.70	$5.33	$32.03	$73.33	$41.30
Montreal	12.83	7.07	3.81	23.71	60.86	37.15
Saskatoon	14.13	7.07	3.81	25.01	60.42	35.41

SUMMARY

The results obtained in the foregoing experiment seem to justify the following comment thereon:—

1. The most profitable shipment was No. 1, where the cattle were shipped alive to Birkenhead, England, and sold in sink at that point.

2. There appeared to be little difference on arrival in the appearance or condition of the carcasses prepared in Saskatoon as compared with those prepared in Montreal.

3. Although there is little difference in the returns from the Saskatoon and Montreal lots—$1.74 per head—it is probable that a shipment killed in Montreal is exposed to less chance of temperature variation than one killed in Saskatoon and shipped to Montreal in refrigerator cars. Further, the Saskatoon beef arriving in England is four or five days older than that killed in Montreal. The latter has a better chance of arriving in good condition.

4. The temperature of the refrigerator cars is not uniform throughout the car, being lowest at the two ends at the bottom and highest in the centre at the top. Although this is perhaps not so important in the case of certain products, the range of safety in the case of chilled beef is so small that, if the car temperature is such that the sides hung at the ends are at the correct temperature, those in the centre will be exposed to a temperature very much too high.

5. It is not possible to hang large sides (over seven feet in length) in refrigerator cars owing to lack of height; and, as quartering detracts from the value of the carcass, it would seem that inland killing and shipment, chilled in sides, of two-year-old or larger animals is impossible. The same is true of the refrigeration chamber on board ship, only a few ships have sufficient head room to handle large carcasses.

6. At present prices, it would seem to be more practicable to ship the edible offal frozen to Great Britain than to sell it in Canada.

7. It is evident that the success of the Canadian chilled beef trade will be controlled by the condition of the chilled beef arriving at Smithfield. The avoidance of "souring" and "bone taint" is essential and therefore the time elapsing between the slaughter of the beef and its appearance on the stall in Smithfield should be as short as possible.

8. Time might be saved in the pre-cooling process by chilling the freshly killed beef more rapidly. In the case of the Montreal and Saskatoon lots, forty-eight hours of gradual chilling were allowed at chamber temperature, about 34° F.

9. Shipping chilled meat with other commodities in the same chamber is unsatisfactory.

10. The practice of shrouding the carcasses appears to have no commercial value in the British market. British beef is never shrouded.

11. Molds which frequently give trouble in meats held at high temperatures were entirely absent in this shipment.

12. No trouble was experienced from condensation. The meat, when removed from the refrigeration chamber to the market, did not "drip" or "sweat" in the slightest degree.

13. Close observation of various shipments under different conditions prompts the belief that only where meat is held at a temperature sufficiently low to form ice crystals in the outer layers does the question of condensation become of practical importance.

14. Forwarding chilled beef presents much greater difficulties than those encountered in the handling of a semi-frozen product.

15. Varying temperatures to which the meat was exposed during loading and transferring from cars and abattoirs to the ship, together with additional and unavoidable delay at London, in all probability was partly responsible for the unsatisfactory condition of the meat on arrival.

16. The meat was in perfect condition when leaving Montreal. On arrival in London, slight deterioration was noticeable. Whether this was due to temperature or time factors or a combination of both is not clear, although there is reason to believe that the rapidity of cooling is directly related to the condition recognized as "bone taint" in chilled meat.

17. The question of proper rate of cooling and correct temperatures at which to carry chilled meat from Canada is still to be worked out.

In conclusion, it might be said that Canadian chilled top quality baby beef is entirely suitable for the British market as far as conformation, type and finish are concerned; and, if the meat can be landed in good condition, the likelihood is that the price would closely approach that of the home-grown or home-killed product. This means that it would command a price very much higher than that ordinarily obtained for the products of Argentine and Australia. In the face of this, however, is the fact that, even though these prices could be obtained for the chilled product, this experiment has demonstrated that the same class of cattle forwarded alive will be likely to net a greater return.

ACKNOWLEDGMENTS

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SOME METHODS OF CONTROLLING THE SPREADING OF INTERNAL PARASITES OF THE HORSE

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Investigations into the prevalence of animal parasites in domestic animals during the past decade have shown that, in temperate climates, they are by far the greatest source of loss to stock owners. Unfortunately, the greater proportion of the loss is occult and consists in loss of condition, lack of growing power and inability to meet concurrent disease because of the continuous and insidious action of the parasites within the various hosts. In addition to the actual damage done to the host these parasitic worms must, of necessity, use a considerable proportion of the animal's food. Modern agriculture and transport has distributed these parasites so thickly and so generally that estimates of the loss suffered by the owners of live stock in Canada alone, must amount to tens of millions of dollars annually.

No animal is more consistently infected with internal parasites than the horse. In addition to Bots, Stomach worms, Round worms, Pin worms and Tapeworms, they are invariably infected—generally heavily infected—with a group of blood-sucking, tissue-feeding nematodes called Sclerostomes, which live in the large intestine; the losses caused by this group alone, must reach enormous figures.

Worm parasites cannot multiply within the body. One infective stage entering the body can only become a single adult. Their eggs or larvae must, in all cases, spend some time outside of the body before re-entering, and a heavy infection, therefore, must depend on a large number of these infective forms being swallowed. These parasites lay minute eggs which pass from the host in the droppings; there, they embryonate and hatch; the small larva which emerges, feeds and moults and feeds again on the bacteria in the droppings or on the adjacent ground. It is not until it has moulted on the second occasion however, that it is capable of infecting the same or another host. This second moult takes place in about four to five days in hot weather, and a correspondingly longer time in cool weather. Once this infective stage has been reached, the larva ceases to feed, becomes very resistant to adverse influences and does not develop further until it is swallowed by a horse. After a more or less complicated migration in the animal, depending upon the species of Sclerostome involved, it settles down and develops to sexual maturity; it is during this part of its life cycle that it does the greatest damage to the host.

While it is possible to effectively destroy the adult worms within the horse, it is, unfortunately, completely impossible to destroy the migrating forms. Accordingly, to minimize the damage which these parasites do, it is necessary to attack the worm during its stages *outside* of the animal. As we have seen, these consist of the egg, the free-feeding larvae and the infective larvae. The egg, *before* embryonation, is very resistant to the

[1] Research Assistant and Honorary Research Associate.

[2] Paper read before the Canadian Society of Animal Product—Eastern Section at Macdonald College, P.Q., June 27, 1934. Investigation conducted with financial assistance from the National Research Council of Canada.

extremes in temperature and climate encountered in this country. Even a severe winter such as we experienced this year, did not kill sclerostome eggs; it merely inhibited development. The embryonated egg and the free-feeding larval stages are much less resistant, however, and are relatively easily killed. The infective larvae, on the other hand, are again extremely resistant to drying, cold and heat—these larvae are so resistant to drying that they have been collected from the dust collected on window-sills of stables unused for two years and have been easily revived on moistening.

The problem confronting us at the moment is to develop a method of killing those free stages in the manure, so that treated manure would be non-infective for horses and, at the same time, would not lose its manurial properties. The agencies suitable for doing this may be grouped as physical or chemical.

CONTROL IN STABLE AND FARM YARD

A. Physical Agencies

(1) ***Drying.***—Drying of freshly passed manure, spread in thin layers and exposed to the sun, is practicable only in dry tropical climates such as the Sahara. Manure treated in this way is useless as manure, but is valuable in those regions as fuel. Accordingly, its practicability is limited to those areas where the fuel value is more important than the fertilizing value, or in military encampments, where its preservation is a matter of secondary importance to its disposal; it is not practical in Canada.

(2) ***Freezing.***—Frequent alternate freezing and thawing can be relied upon to kill the free-living stages, but as I mentioned above, I found that the continual low temperatures experienced in Canada this year were insufficient to kill the eggs; they merely retarded development, the eggs embryonating and hatching normally in the spring.

(3) ***Heating.***—Schwartz, of the United States Bureau of Animal Industry, has ingeniously used the heat of fermentation for killing both the eggs and the larvae. A temperature of approximately 70°C. is necessary for this; such a temperature is easily reached in the *centre* of a well-packed manure heap, but the heat in the outer edges of the heap is insufficient to kill the eggs and larvae. To obviate this, Schwartz has developed a double, wooden box which maintains a more even temperature and which works quite effectively. The application of this method is limited to well-equipped stables on well-to-do farms; it is not a practical procedure on the ordinary farm because of the expense and trouble entailed.

B. Chemical Agencies

The use of a chemical disinfecting agent applied to manure is governed by the following principles:—

(1) It must be cheap and easily obtainable.

(2) It must have no deteriorating effect on the fertilizing value of the manure.

(3) It must be harmless to both plants and farm animals.

My experiments during the past eighteen months have shown that the most effective, readily available, lethal agent is urine—that of cattle being

as effective as that of horses. Soaking the manure with urine, even when diluted with an equal quantity of water, kills all the infective larvae within forty-eight hours, and most of them, within twenty-four. This agent not only complies with the three principles I have enunciated above, but has the additional advantages of *increasing* the fertilizing value of the droppings, and utilizing a valuable fertilizing agent which is generally wasted. To use it economically, stables and cow sheds should have a catch-pit into which only a limited amount of water is allowed to drain. A pump to allow the urine to be sprayed on the manure in sufficient quantities to keep it entirely wet, would be desirable. Alternatively, a water-tight concrete midden could be filled with the horse droppings, and the urine pumped into it; after two days, the latter could be run into the catch pit. If such a midden were built, five feet deep and nine feet broad, with its top projecting two feet above the level of the road, carts could be easily filled by hand from it. On most farms it would be necessary to have two such middens, or one divided into two, one half being filled while the other was being treated. Urine appears to be equally lethal to the larvae of strongyle worms of ruminants, and the manure from the stables of sheep and cows could easily be rendered parasitologically safe in an identical manner.

Having discovered that natural urine was an effective agent for destroying nematode larvae in manure, experiments were conducted to ascertain the action of chemical substances—mostly artificial fertilizers—easily available to farmers.

Urea, which is one of the main constituents of urine, is nowadays manufactured synthetically as a nitrogenous artificial fertilizer. As a lethal agent against worm larvae, it proved to be of great efficiency, half a gram sterilizing 40 grams of horse faeces in forty-eight hours. Probably because of more effective mixing, it is more lethal in solution than in the dry state. Like urine, Urea enhances the fertilizing value of the natural manure.

Nitrate of Soda, *Sulphate of Ammonia* and *Muriate of Potash*, are also lethal, in practical concentrations, when tested on small samples. When used in bulk, however, they very quickly become ionized and the lethal action almost entirely disappears. Solutions again are more effective than solids, probably because of the more efficient mixing. The use of any of these three substances would necessitate large quantities and very efficient mixing.

Other substances used as fertilizers, such as *Ground Limestone* and *Superphosphate* have little, if any, action on the worms. *Hydrated Lime* is lethal, but its action on the manure and the difficulty of handling make it useless for this purpose.

Common salt has some lethal action but it has the great disadvantage of adding little value to the manure; accordingly, unlike the others, none of its cost can be recovered in benefit to crops.

This method of treating manure with urine or urea, if applied to *all* horse droppings, could be relied upon to completely exterminate this group of parasites. It is impossible, however, to collect droppings from the roads and, especially, from the pastures. Accordingly, a series of experiments has been commenced to find if similar applications of physical

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agents, artificial fertilizers or other chemicals to manure *on fields* has any effect on the sclerostome larvae.

FIELD CONTROL

(A.) Physical Agencies

In addition to those discussed above, another physical agent may be employed on the field. The infective larvae do not feed but live entirely on fat, glycogen and so on, stored up during the free-feeding period. Once this food store is exhausted, the larvae die. If kept quiet, under laboratory conditions, I have been able to keep them alive for over eighteen months, but their possible active life-span is probably longer. However, moderate heat and light stimulate them to activity and the more *active* they are the shorter the time they live. Consequently, repeated harrowing of the fields to break up the manure, exposes the larvae to physical agents and so *reduces* the life. This method however, cannot be relied upon to *eradicate* the worms.

(B.) Chemical Agencies

The same chemicals (including urine) used above, applied, in *practical quantities*, to experimental grass plots containing horse manure in the proportion of two tons per acre, have so far failed to kill larvae within a week. A similar failure was obtained with 1% and 2% *Copper Sulphate*. These experiments however, are being continued.

Another source of infection lies in larvae developing in small quantities of droppings which have been overlooked in the stables. In practice, this is a very serious source of infection and it was decided to ascertain the value of various standard disinfectants in killing infective larvae and so reducing infections. *Dakin's solution* and its commercial variants, 0.66%, and 1% *Lye* and 2% *Permanganate of Potash*, applied for short periods all fail to kill the larvae. Even 2% *Creolin* requires some hours to destroy the larvae. The most effective disinfectants which I have tested so far are 3% *Lye* and 5% *Lysol*, both destroying all larvae in faeces within an hour. These disinfectants have a similar effect on sheep-worm larvae. These experiments are being continued.

ACKNOWLEDGMENTS

I wish to take this opportunity of thanking my colleagues Dr. R. R. McKibbin and Prof. L. C. Raymond for their valuable assistance and advice during the course of this investigation.

THE MOST PRACTICAL FIELD AND LABORATORY TESTS FOR DETECTION OF MASTITIS[1]

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Mastitis or garget is a bacterial infection of the udder caused most frequently by *Streptococcus agalactiae*. The incidence of the subclinical form (which is mainly characterized by changes in the milk) in high producing herds is astonishing. It is probably related to high milk production and brought about by an overworked physiological function lowering the resistance of the mammary gland to invading micro-organisms.

To-day the streptococcical mastitis is considered as one of the most frequently occurring and, from an economic standpoint, perhaps one of the most important of all the bovine diseases. Conservative estimates of many countries indicate that at least one-third of the cows of the high producing herds are affected with this disease. Only few of the great herds have been found free of mastitis. In some herds the infection runs as high as 90%.

In mastitis not only the quantity of milk is reduced, but the quality is changed in its chemical, biological, and other aspects. The most commonly used tests of mastitis are based on the determination of some of these milk alterations. The most important alterations in the milk, caused by mastitis, are the following ones, which are listed in the order in which they can be most readily utilized for a practical and rapid diagnosis:—

(1) Chlorine increase, which permits the chloride field or laboratory test.

(2) pH increase or sometimes decrease, and lowered acidity which permits the pH field test and titrable acidity laboratory or field test.

(3) Catalase increase allowing the catalase field or laboratory tests.

(4) Cells increase, demonstrable by the leucocytic test, or macroscopic or microscopic sediment test.

(5) Diminishing of the sensibility to rennet, and appearance of soft curd.

(6) Presence of streptococci or pathogenic bacteria in incubated or non-incubated aseptically taken milk samples.

(7) Lactose decrease demonstrable by lactose field or laboratory test.

(8) Presence of clots as shown by the black cloth filter or strip cup tests.

(9) Visible abnormalities or changes in the character of the milk.

The above are the milk alterations which offer the most practical methods for detecting mastitis, as we have been convinced by the testing of approximately 8,000 samples of milk from separate udder quarters in the last 6 years.

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[1]Paper read before the Canadian Society of Animal Production—Eastern Section, at Macdonald College, P.Q., June 27, 1934.

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Other alterations in the milk which are not of as practical importance for diagnosis, are the following:—

Fat often decreased.
Casein always decreased, and probably changed in its character.
Heat coagulable albumin, increased.
Solids non-fat decreased.
Ash decreased.
Calcium and potassium decreased.
Sodium increased.
Electric conductivity decreased.
Viscosity ordinarily decreased.
Water percentage increased.

From the above outline we can see that the milk substances elaborated by the glandular cells are decreased in the diseased udder, and that the substances due to inflammatory reactions, *i.e.*, chlorine, leucocytes, catlases, etc., are increased. We can see also that the chemical and biological tests are listed as more practical and effective for diagnosis than the bacteriological ones.

All these tests, especially the chemical and biological tests, give their best diagnostic results when employed in the milk of individual cows, and preferably in milk of separate quarters and in fresh milk, except the chlorine test which can be used in old milk. Chemical alterations cannot be detected as well by studying the mixed milk of many cows or even of the four quarters, if, as it most frequently occurs, only one or even two of the quarters are affected. It is because of this, that diagnoses with mixed milk cannot be taken as definite. Although it is very important that the tests be carried out with the milk of each quarter of the udder separately, by the use of certain tests, however, mastitis may be detected in mixed milk if this milk contains approximately 10% of mastitis milk of diseased udders.

One of these tests, which is described later, may suffice, if clearly positive, to establish the diagnosis of the disease. But no one alone is 100% efficient, and the accuracy of the diagnosis increases by using simultaneously two or three or many tests.

Besides these tests based on the altered quantity and character of the milk, palpation of the udder, after having been emptied, offers also a means of diagnosis when the disease has progressed to a point where noticeable induration of the tissues is found.

The order in which we usually proceed to test a herd for mastitis is the following:—

(a) pH.
(b) Rapid catalase.
(c) Rapid chlorine test in the stable, testing every cow on each separate quarter, and after this,
(d) The black sieve cloth test.

With these four tests, but especially with the first three, we ordinarily find nearly all or all the cows diseased from mastitis, and one person alone or with a helper may test in this way approximately 15 cows per hour.

After these tests we take samples from the doubtful cows and from those in which we are interested to make extended tests in the laboratories. We may also determine the comparative quantity of milk in different quarters by milking out these and measuring the quantity of milk, and by making a deep palpation in each one of the emptied quarters palpating for nodules or other indurations in the milk ducts and in the mammary glands.

The milk samples for bacteriological purposes should be taken as aseptically as possible into sterlized test tubes, and all the samples destined for the laboratory immediately cooled and kept on ice till the laboratory tests are done.

TECHNIQUE AND INTERPRETATION OF THE ABOVE MENTIONED MOST PRACTICAL TESTS.

1. The testing for pH or actual acidity

The pH value of freshly drawn normal milk is from 6.3 to 6.7. To determine this, we take one cc. or 5 cc. of milk into test tubes which are marked for these quantities. We strip directly from the teat into the test tubes, holding four test tubes in the left hand. The tubes are conventiently marked with letters (a, b, c, d,) corresponding to the quarters a and b, front right and front left, and c and d, rear right and rear left. With one pipette or reohmeter add .2 cc. of bromthymal blue to 1 cc. of milk (or 1 cc. of bromthymal blue to 5 cc. of milk) and mix thoroughly. The color change should be observed in good light. Wash the test tubes with distilled water or better with the milk of the quarters that are being tested before taking a new test. A lowering of the acidity greater than pH 6.7 ordinarily indicates mastitis in some form, particularly if this occurs in separate quarters.

A fresh normal milk gives a greenish yellow coloration, shades varying from a yellowish green to a greenish yellow. Dark green, green blue and blue colorations—shades very easily recognized and indicating a pH of 6.8 to 7.6—are definite proof of mastitis. In the last periods of lactation some cows give a pH of 6.7 to 6.9—a deep shade of green—*for each quarter* (old milk or retention milk) and cows in the first period of lactation give a pale yellow coloration *for each quarter;* also colostral milk. Without exception, when a pH of 6.8 or more (colour, green-blue with bromthymol) was found *in separate quarters*, the others examination verified the result by also proving the existence of mastitis. The solution of bromthymol blue is prepared by adding 0.65 gr. of bromthymol blue to 1,000 cc. of 68% ethyl or methyl alcohol. A stronger concentration of bromthymol blue may be used; i.e., 2 gram in 200 cc. alcohol and 5 drops added to 3 cc. of milk for the determination of the pH.

Bromthymol blue paper test. The pH test may be carried also with nearly the same accuracy using the bromthymol blue paper. This consists of small pieces of filter paper impregnated with a solution of bromthymol blue. For its use one or a few drops of milk are stripped from each teat in four separate places on the paper and the colors obtained compared with each other. The color differences are better seen by transparency.

II. Titrable Acidity of Freshly Drawn Milk

Samples of fresh milk from separate quarters are titrated with phenolphthalein as an indicator. If the acidity is found to correspond to less than 0.10% lactic acid in one quarter and higher in the other, this is a very probable indication of the presence of mastitis. Normal fresh milk shows an acidity of 0.12 to 0.15%. The titrable acidity of fresh milk is due principally to the casein and acid phosphates which diminish in diseased glands. Van Slyke and Baker first demonstrated that, in cases where the acidity was decreased and the pH was correspondingly increased, there was a decrease in the specific gravity of the non-fatty solids and an increase in the chlorine and protein other than casein.

III. Chlorine Determination

The chlorine determination test is one of the most important tests for the diagnosis of mastitis in its early stages, since the chlorine content increases in any inflammatory alteration of the mammary gland. The chlorine content of a normal milk varies from 0.8 to 0.12%. After comparing the findings of the chlorine determination with other tests in more than 5,000 samples taken from the separate quarters, we believe that a content of more than 0.14% of chlorine is always related to pathological changes in the udder. A milk having a greater chlorine content than 0.14% should be considered abnormal. In the case of a severe inflammation of the mammary gland, the chlorine content may increase to 0.3% from 0.1% as in normal milk.

The chlorine determination has this important advantage. The tests may be carried out with any kind of milk, whether it be a fresh or an old sample, or whether the sample may have been taken under the most unsanitary conditions. It is the only laboratory method for the diagnosis of mastitis whose results are uninfluenced by deterioration of the sample.

Technique for Chlorine Determination.—In our opinion, the following method is the most simple and rapid, being accurate. Forty cc. of distilled water are added to 10 cc. of milk in a small beaker. Eight to 10 drops of a 10% solution of potassium chromate are added to give a canary yellow colour to the diluted milk. N/10 silver nitrate solution is added from a burette until the first permanent deep orange color appears. The number of cc. of silver nitrate necessary to produce this change multiplied by 0.0355 will give the chlorine content in grams present in 100 cc. of milk. By the use of a suitable table the percentage of chlorine in the milk may very easily be determined. If more than 4 cc. of N/10 silver nitrate are required to neutralize the chlorine in 10 cc. of milk, mastitis is present.

Rapid or Field Chlorine Test.—The following method has been devised by Miller-Rosell, in the Bureau of Animal Industry, Washington, D.C.

Five cc. of milk are drawn directly from the quarter into a test-tube suitably graduated. Eight to 10 drops of a 10% solution of potassium chromate are added to give a canary yellow color. Four cc. of a freshly prepared N/20 silver nitrate solution or 2 cc. of an N/10 solution are added with a pipette or syringe and the mixture gently shaken.

The immediate appearance of a reddish color is indicative of a chlorine content of less than 0.14 gm. in 100 cc. of milk, and therefore is to be considered a normal reaction. If the color remains unchanged, the quarter is diseased. Since this is a quantitative reaction, the addition of 1 or 2 cc. more of the silver nitrate solution may give a rough idea of the extent of the increase in chlorine. The larger the amount of silver nitrate which is necessary to produce the red color, the more chlorine is present and probably the more intense is the disease. The salty taste of milk is also a sure sign of mastitis.

IV. Catalase Test

Catalase is a special enzyme secreted by the leucocytes which increases in inflammation. In this test the property of catalase for splitting H_2O_2 is put to use.

The majority of reports consider the catalase test as 80 to 90% accurate in the diagnosis of mastitis. Our results are in agreement with this figure. The simplicity of the test, which does not need any elaborate apparatus, constitutes an advantage over the pH test.

Technique of the Test.—Five cc. of freshly diluted 1% hydrogen peroxide is mixed with 15 cc. of fresh milk which has been well shaken to insure an even distribution of leucocytes. The mixture is then placed in a Smith fermentation tube and the closed arm filled, care being taken to exclude all air bubbles. The tube is allowed to stand for two hours in the incubator or 10 hours at room temperature. The reading is made by measuring with a centimeter scale the volume of gas which may collect in the closed arm of the tube. The results are tabulated in centimeters. From our experience, values over 0.5 cm. are to be considered as abnormal and those over 1.5 cm. as indicating definitely disease. In making this test it is very desirable to use fresh milk and freshly prepared hydrogen peroxide. However, it is possible to use milk preserved with 0.1% formalin or milk which has been held in the ice-box for 24 hours. In such cases a smaller amount of oxygen will probably result from some loss of catalase and this factor must be considered in making the reading.

Rapid Field Test.—At present the most satisfactory test for catalase is a procedure for the laboratory. However, a rapid test may be made in the stable by mixing five or six drops of milk with two or three drops of freshly prepared 9% H_2O_2 on a piece of flat glass over a dark background. The appearance of bubbles within a few minutes after mixing is considered a positive reaction. Greater accuracy can be obtained by observing this reaction with a hand lens. In view of the fact that a large number of leucocytes are required to produce such a reaction, it is probably that many cases of actual mastitis will be overlooked, if this test alone be used.

Also another rapid catalase test consists of adding 2 cc. of 3% or better 6—9% H_2O_2 solution to 5-10 cc. of milk in a test tube. On normal milk no gas formation is observed. In mastitis milk the gas and foam formation may fill the tube.

Bromthymol-catalase Test.—One very reliable *combined test* which we use constantly in the stable is the double bromthymol-catalase test. For this we ordinarily take test tubes marked for 5 cc. of milk, with a second mark for 1 cc. of bromthymol blue, and with a third mark

for 1 cc. of 6% of H_2O_2. Having the four tubes with the 5 cc. of milk of each quarter in the left hand we add 1 cc. of bromthymol and read the pH. Then we add immediately to the milk-bromthymol mixture, 1 cc. of the 6% H_2O_2 and observe the smallest appearance of gas bubbles indicative of mastitis. In the great majority of cases where the bromthymol indicates mastitis, we find also that the rapid catalase test is also positive. The 6% solution of H_2O_2 is very easily prepared by taking 20 cc. of 30% Superoxol Merk and 80 cc. of water. With this combined double field test it is very seldom that a diseased quarter remains undiscovered.

V. Lactose Estimation

The normal amount of lactose in the milk is 4 to 5 %. In mastitis the lactose-producing function is diminished or lost, and we have found mastitis milk in which lactose was entirely absent.

To determine lactose, in addition to the ordinary copper reduction test and the polariscopic methods, the following method may be useful: Mix 2 cc. of milk with 1 cc. of 25% solution of potassium or sodium-hydrate and boil in a flame for one minute until it acquires its maximum color. Normal milk gives a deep red cherry color, corresponding to 4.5% lactose. The less lactose, the less intense is the color.

VI. Macroscopic Stable Tests

The Black Cloth Filter or Strip Cup Test. This helps much to identify mastitis in advanced cases where the milk contains flakes or clots of pus, or masses of leucocytes. The smallest amount of solid particles is a proof of mastitis.

Also every abnormal aspect in fresh milk and in the cream, as much in color, transparence, as homogeneity and flavour or taste, should be considered as suspicious of mastitis.

VII. Laboratory Tests

The Macroscopic Sediment Test. -In conducting this test, 10 cc. of milk (better warm milk) is centrifuged at 3,000 r.p.m. for 15 minutes. The supernatant fluid is then decanted and the character and quantity of the sediment observed. By this test, clean, normal milk should not give an appreciable sediment. A sediment exceeding approximately 0.1 cc. can be considered abnormal, especially if the color indicates the presence of pus (yellow) or blood (red). Clean, normal milk leaves practically no sediment in a 10 cc. sample of milk.

The Microscopic Sediment Test. The sediment is diluted with an equal part of sterile physiological saline solution and thoroughly mixed. The contents of a loop, or, better, 0.1 cc. of this mixture is spread over an area of approximately one square centimeter, as in Breed's smear technique. The film is allowed to dry in the air and is then fixed and stained with methylene blue, or by Breed's method.

It should be pointed out that, in making the sediment test, there is some possibility of having an uneven distribution of leucocytes because of the tendency of these cells to rise in the cream layer, and, therefore, not to

appear in the sediment. This can be avoided to some extent by diluting the milk with an equal volume of distilled water and by warming the mixture to 45° or 50°C. before centrifugation. In centrifuging this mixture, it is essential that the maximum speed of the centrifuge be reached as quickly as possible.

Interpretation.—In judging the results of this test we consider normal an average of 6–10 leucocytes per field when a one-twelfth oil immersion and a 10x eyepiece is used on the microscope; over 10 indicates disease. This figure has been accepted in our studies, being based on the work of several investigators as well as on our own findings. It is believed that in perfectly healthy quarters the leucocytic content of the sediment should be considerably less, probably not exceeding three to four cells per field of sediment. *If the smears are made from unsedimented milk*, our studies have shown that *less than one leucocyte per ordinary field* of microscope is found in milk from healthy quarters.

In the sediment observed under the microscope all abnormal products of a diseased mammary gland should be carefully studied:

*(**a**)* The absence and type of leucocytes and lymphocytes. Many conclusions can be drawn from the number of the leucocytes, their morphological appearance and the evidence of phagocytic power. Not only can the diagnosis be confirmed, but to some extent the type and stage of the disease determined.

*(**b**)* The presence of erythrocytes.

*(**c**)* The number and kind of cells from the glands and their ducts, exhibiting different stages of degeneration.

*(**d**)* Particles of tissues, crystals, hematin and other pigments, caseated fibrin, mucin, etc., should be noted, but special attention should be given to the bacteria in the microscopic examination.

According to Prescott and Breed, the average number of leucocytes, determined by comparative counts on mixed commercial milk, is in the proximity of 500,000 per centimeter of milk. This number corresponds approximately to one leucocyte per field, using 1/12 oil-immersion objective and an ocular lens of 10x. Valuable contributions have been made by Udall, Johnson, Hucker and Truedel-Henning to our knowledge of this subject. After many year's comparative observations, we consider that more than 250,000 leucocytes in one cc. of milk is to be taken as a sign of mastitis.

Bacteriological Examination

Microscopic Examination of Milk Sediment. The typical appearance of mastitis streptococci in milk or milk sediments, especially if the milk has been incubated, is well known. Long or short chain streptococci in milk drawn aseptically with the presence of a number of leucocytes are diagnostic of mastitis. Certain so-called saprophytic udder micrococci are present without exception in all aseptically drawn milk. Differentiation of these from mastitis streptococci rests on cultural studies, which are also necessary for better bacteriological tests of the disease.

A NOTE ON THE DIAGNOSING OF BOVINE STERILITY[1]

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It has been stated by many people in governmental positions that approximately 33% of the work being done by the agricultural department is related to animal diseases. With the increase in numbers of herds said to be free from tuberculosis the discussion of dairy cattle problems appears to center about disorders of the reproductive system. The two chief problems, according to agricultural agents, include the problem of sterility within the caption of Bang's Disease. Sterility does occur on a complication with any infection whether it be *Brucella abortus* or micro-organisms having a more general distribution in the genital tract.

The term sterility is used in a very compromising manner with reference to reproduction. The general application of the term actually refers to some upset in, or failure of the reproductive system to carry on in a physiological manner. If the reproductive cycle is interrupted for a matter of weeks the animal is said to be sterile. The same animal may then reproduce in quite a normal manner according to clinical observation without the previous history being used as evidence against the individual. The truly sterile animal should not reproduce at any time; it is, therefore, quite evident that the term sterility has been and is much misused.

There are a great many causes of infertility among the dairy animals and many of them are preventable. Before considering individual conditions believed, or said to be the causes of infertility let us consider the various portions of the tract of each sex under normal conditions.

In the female the ovaries carry on the process of ova production which gives rise to the symptoms known as oestrum or "heat". Among normal females this cycle requires from 18 to 21 days. It may vary slightly in either direction but should remain constant for the individual. When ovulation takes place there is a definite cavity within the ovary and considerable haemorrhage usually follows the eruption of the ovum. The cavity when filled with blood is known as *corpus haemorrhagicum*. This same body undergoes changes depending upon whether the ovum becomes fertilized or not. If fertilized it forms a *corpus luteum* (yellow body) of pregnancy; if not, it atrophies. The luteum cells develop as an outgrowth from the wall of the erupted egg sac. Some follicles fail to rupture and they may undergo regression. Such follicles are usually termed atretic follicles. The next portion of the tract, the fallopian tubes, is about one-eighth of an inch in diameter extending from the region of the ovary to the tip of the horn of the uterus on each side. In the portion near the ovary the tube is spread out into a funnel shaped process. The hollow portion of the tube is approximately the diameter of a coarse hair. During the reproductive cycle spermatazoa may travel up the fallopian tube toward the ovary while at a later stage the ovum may descend by the same path.

The uterus of the bovine species is bicornuate; it does not contain a body as does the uterus of the equine species. The horns of the uterus serve as a receptacle for the fertilized ovum and in them the foetus develops. On the inner wall there are four distinct layers of caruncles which in the

[1] Delivered in connection with a demonstration on bovine sterility presented before the Canadian Society of Animal Production—Eastern Section, at Macdonald College, P.Q., June 27, 1934.

pregnant state are called "buttons" or cotyledons. It is through the cotyledons that the circulatory exchanges occur between the developing foetus and the dam. The placenta (foetal membranes) develop in both horns of the pregnant female but they are more highly developed in the horn carrying the foetus. The external opening of the uterus is called the cervix. The cervix is a very tortuous canal and folds of membrane appear at intervals throughout its length. The vagina and external genitals do not require further explanatory remarks.

Inflammatory conditions are accompanied by signs which are considered as classical. They consist of redness, heat, swelling, pain and altered function. The causes of inflammatory reactions are numerous. In the genital organs we are concerned chiefly with mechanical injuries and infection. On the surface of the body one may readily recognize the various signs of inflammation while with internal structures the problem becomes more difficult. From the observations which may be made by every individual one cannot help but realize that inflammatory proceses within the component parts of the genital tract may inhibit the normal processes of these organs. The best example of inflammatory reaction that is familiar to all is that termed the "common cold". If the same changes occur within the fallopian tubes, uterine cornu, cervix, vagina or any other portion of the tract, is it possible to anticipate that the tissues will function in a normal manner more quickly than will the tissues of the respiratory tract? For this reason local inflammatory conditions within the genital tract bring about infertility. If the inflammatory state is corrected either by rest or medicinal care then the infertility is of short duration. If, on the other hand, the inflammatory process is of a virulent nature or reaches a chronic state or if the healing process inhibits the physiology of the tract then the sign of infertility may persist.

The importance of examining the placenta from each animal at each period of gestation cannot be stressed too greatly. A great deal of breeding disorders might be mediated by following such a procedure and keeping careful records of the placental conditions. Infertility in many cases may be attributed to anti-natal disease.

The part of the male in the picture of infertility among bovine species is frequently complex. Inflammatory processes in the testicle may result in the production of mal-formed sperms or in the cessation of sperm production or ejaculation. In the absence of spermatozoa infertility is complete. We may have all gradations of infertility in the male without danger of disseminating disease to the female yet many males with low fertility have been found extremely dangerous owing to the presence of infection in the organs.

Detection of disease conditions in the male may be accomplished through clinical examination aided by microscopic examination of the seminal fluid. Infertility of the male may also be caused by the lack of exercise, faulty nutrition, congenital and physical defects. Each case of infertility must receive careful attention and a diagnosis established only after all the evidence has been considered. The problem of infertility is an important one which involves the field of animal breeding, nutrition, management, genetics, physiology and pathology and affects both sexes indiscriminately. To accomplish satisfactory results in the attempt to cope with this problem we must have the concerted effort of all evidence having to do with live stock in the state of health.

THE RELATIONSHIP OF PARASITISM TO THE POULTRY INDUSTRY[1]

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The economic importance of the poultry industry from an individual or national standpoint merits the closest consideration. Vitally necessary to the home, and providing an efficient source of revenue in the mixed farming programme as well as in the specialized areas, the need for conservation of this great industry becomes a truism. It is estimated that the annual income derived in Canada from poultry and poultry products totals approximately fifty millions of dollars thus marking it as one of the foremost agricultural enterprises of this country.

The problems confronting the poultry industry are many and varied, and amongst these problems the presence of disease appears to be one of the main limiting factors in an otherwise profitable undertaking.

While specific infections are decimating and deadly in their effects, a more or less intimate association with this industry convinces one that internal parasitism constitutes a real, if not greater, menace to success than the former. The insidiousness of internal parasitic infestation is in itself disarming and it is not at all surprising that the average poultryman only realizes the seriousness of such a condition when in dire straits and facing severe financial loss. Unlike bacterial diseases which are of an extremely toxic and fatal nature, parasitic infestations, with a few exceptions, are not conducive to an early death. The verminous juices elaborated within the animal organism apparently possess a low degree of toxicity capable however of causing hemolysis and destruction of red blood cells. The resultant anemia and traumatic lesions caused by many species of tapeworms and round worms together with assimilation of essential food substances, induces metabolic disturbances of grave consequence. Coccidia, of which there are six known species in hens, are an exception to this rule, the destruction of the intestinal mucosa inducing an acute hemorrhagic type of disease frequently attended by a high rate of mortality.

Until the mythical belief of spontaneous generation becomes a reality, known scientific truths in regard to origin of disease must be accepted. It is perhaps trite to again quote the old axiom, "Like begets like"; nevertheless all biologic and genetic studies justify such a conclusion. Parasitological research has shown that young growing stock become infected through direct or indirect contact with older fowls which having developed a tolerance or immunity to the types of helminths or protozoa that they harbor are capable of withstanding their ravages and of acting as reservoirs of infection. In the case of nematodes, the eggs or ova passed in the droppings of such harboring hosts, may reach an infective stage with the larva still enclosed within the shell, in which location it is very resistant to all inhibitive influences such as extreme heat, cold, desiccation, etc. Or

[1] Contribution from Poultry Pathology Laboratory, co-operatively maintained by Health of Animals and Dominion Experimental Farm Branches. Presented in connection with a demonstration on parasitology before the Canadian Society of Animal Production—Eastern Section, at Macdonald College, P.Q., June 27, 1934.

[2] Animal Pathologist.

contrariwise, the perpetuation of certain species of round worms depends upon rupture of the egg shell and liberation of the larvae which undergo several moults before reaching a stage at which they are capable of reinfecting the original or infecting the new host. If peradventure, the larvae in this latter case encounter unfavourable environmental conditions, they die rapidly. In the event of the infecting parasite belonging to the cestode or trematode family (tapeworms and flukes) a secondary or intermediate host is necessary for its survival and propagation.

In poultry, a good example of this may be found in the minute tapeworm *Davainea proglottina*. In order to survive, the gravid or ripe segments containing innumerable ova each of which harbors a living embryo technically termed an onchosphere, are passed in the droppings. This onchosphere characterized by the presence of several hooklets, the movements of which under magnification are readily discernible, is ingested by different species of slugs and snails. In the bodies of these secondary hosts, the young embryo continues to develop to the cystic or bladder stage (cysticercoid). When the secondary hosts are eaten by fowls, the bladder is ruptured, thereby liberating the young tapeworm which at this time consists only of a head and neck (scolex). This developmental form attaches itself to the mucous membrane lining the intestine by means of a formidable armament consisting of four suckers and hooklets. In this position it continues to develop into the strobilate tapeworm by the production of new segments. Segmental growth takes place at the anterior or head end rather than at the tail or posterior extremity as is commonly supposed. As the anterior segments continue to grow the posterior or larger segments are pushed backward to eventually become detached when production has progressed to the stage necessary for further development.

So unusual and enthralling are the life cycles of certain parasites that a recounting of the different stages from egg to adult sounds like a fairy tale. Nevertheless, they are veritable truths and it is the possession of such knowledge acquired by close application and study that makes control at all possible. One could go on interminably outlining the intricate stages of different species of parasites, how one type of tapeworm is dependent upon the intervention of the house fly in the role of secondary host, another upon the stable fly, still others on beetles, grasshoppers and earthworms, but in the compass of a short paper, such is nor possible. Suffice it to say that parasitology furnishes one of the most alluring and captivating studies with a practical application that can be found amongst the sciences known to mankind.

Being equipped with a knowledge of the life history of many harmful and dangerous parasites, the matter of ultimate control while presenting seemingly insuperable obstacles, becomes in many instances a feasible undertaking. While anthelmintic treatment is applicable to many classes of livestock and undoubtedly serves a very useful purpose in reducing parasites to a point where they do apparently little harm, the administration of such drugs in the treatment of parasitism in poultry has not been attended with a great deal of success.

Prevention is therefore the foundation stone on which a profitable venture must rest and the application of measures designed to interrupt the

life cycles is rapidly superseding medication in this and other classes of livestock.

In outbreaks of coccidiosis where studies have shown the liberation of sporozoites to occur with some species as early as forty-eight hours after passage of oocysts, measures designed to keep the birds in confinement to permit of the daily removal of droppings for a week or ten days, have, to a large extent, robbed this dread disease of its terrors. During the period of confinement, the elevation of the feeding troughs and drinking fountains on wire mesh racks prevents the young growing stock access to feed pulled over which becomes contaminated on the floor with the infected droppings. In every case of parasitism the weapons of choice are sanitation combined with every available resource to eliminate intermediate hosts by proper drainage and control of nearby breeding places. Flies in general deposit their eggs on decomposing vegetable and animal matter and in manure piles. It thus follows that the elimination of the carcasses of dead birds, decaying organic matter and the deposition of droppings in screened or covered bins or pits will largely prevent reproduction of these ubiquitous insects, a necessary first step in parasitic control. In conjunction with this latter measure, rotation of poultry runs for the young chicks on a three year plan of interchange also proves beneficial.

All carcasses of birds dying from any cause whatsoever should be burned as the burying of such carcasess, unless to a great depth, may result in infective material being brought to the surface through the agency of earthworms, rodents, etc.

Above all, the complete segregation of the young chicks from the time of being hatched until introduced into winter quarters will accomplish more than any other plan advocated for the control of poultry parasites.

Where a flock is heavily parasitized and losses occur year after year, we are now recommending that the practice be followed of killing off and marketing all the adult birds after the peak of production has passed and a sufficient number of eggs for hatching have been selected. This seemingly drastic step has much in its favour as such a plan if followed automatically stamps out such infectious diseases as tuberculosis, infectious bronchitis, etc. Furthermore, it safeguards the young chicks from exposure to parasitic infestation through the contamination of the brooder houses and runs with infected droppings carried on the shoes of attendents or transported by other mechanical means. Fortunately so-called spontaneous outbreaks of coccidiosis do not occur in chickens hatched from eggs laid by infected parent stock nor do such parasites persist for any great length of time in the soil. This latter plan permits of the preservation of desirable blood lines and from the standpoint of the utility breeder is an economically sound policy.

REPORT OF THE POULTRY COMMITTEE[1]

CANADIAN SOCIETY OF ANIMAL PRODUCTION EASTERN SECTION

At the last meeting of the society held in Ottawa in July, 1932, poultry for the first time constituted part of the programme. An address by Professor W. R. Graham of Guelph on some phases of nutritional research introduced the discussion of poultry problems into the society's agenda. It was felt at that time that this branch of the live stock industry should become a permanent part of the organization. In order to more definitely bring this about, a poultry committee was appointed to bring in a report at the next meeting of the Association.

In preparing the committee's report it has been the feeling of its members that a general survey of the industry in Eastern Canada should first be made and some of the more pressing problems indicated. This would possibly suggest discussion matter for this meeting and a line or lines of activity for succeeding committees. It was felt that possibly some suggestions arising from the said survey might be offered which would lead to a more co-ordinated programme of development within the industy.

Canada has rapidly forged to the front in poultry production and stands out as one of the leading countries in quantity and quality of production per unit. This development cannot be attributed definitely to any one factor or group of factors but rather to a general programme of federal, provincial and institutional work. The research and experimental work along the various branches of the industry have continually tended to lower production costs, removing many of the hazards from time to time confronting the poultryman, and have enabled him to carry on even at a greatly lowered level of prices, the result of world competition. The introduction of grading and better organized marketing conditions have further assisted in improving the general situation. Improved quality in the product resulting from advanced knowledge of poultry nutrition, improved methods of handling and grading of the product have stimulated home consumption until to-day Canada stands pre-eminently the greatest consumer of eggs per capita of any country in the world.

In spite of what has already been done in connection with the many phases of the industry, many problems still remain to be dealt with in placing the industry on the most satisfactory and successful basis from a commercial and economical standpoint.

BREEDING

Egg Production.—It is possible that during the past two decades greater progress has been made in increasing potential egg laying power than perhaps in any other phase of the industry. The work done by the Experimental Farms System, Macdonald College and Guelph, in addition to that carried on in other parts of the Dominion, has resulted in the production of individuals with world breaking egg records. The advance,

[1]Dr. F. N. Marcellus, Professor of Poultry Husbandry, Ontario Agricultural College, Guelph, Ont. Chairman; W. A. Maw, Assistant Professor in Poultry Husbandry, Macdonald College, P.Q.; E. D. Bonyman, Chief Market Poultry Inspector, Dominion Live Stock Branch, Ottawa.

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however, in production, both individual and flock average, has possibly been more satisfactory than the progress made in establishing longevity, egg size and egg quality in addition to the relation of these factors to reproduction and hatchability.

Pure-bred vs Hybrid.—The increased attention being given commercially to the production of sex-linked chicks emphasizes the necessity for more attention on the part of the research worker, the extension specialist and departmental official to this question. Not only is it of importance from the standpoint of the hatcheryman, in determining sex in baby chicks, but it introduces the other problems of the value of hybrid vigour as compared with that of the pure-bred, and the value of and importance of such hybrids from the standpoint of their egg and meat value in relation to economical production. It further introduces the question of how far departmental officials may be justified in recommending the practice of hybridization in view of the possible risk of the breeding of such hybrids in the general breeding programme. What is likely to be its effect upon the standardization of type and quality in the breeding programme? In relation to the matter of sex determination of chicks, what about the question of sexing pure-bred chicks when taken from the incubator? More study of this problem is desirable.

Studies in Hatchability. The work of Snyder of Guelph, as well as others, would suggest that there is a decided genetic influence in the hatchability of eggs. What is wrong with the breeding of most of our standard varieties when hatches of 30 to 60% have become the general rule? Nutrition and season are undoubtedly factors. Against this, however, we have the case of a shipment of 318 eggs of New Hampshire Reds, a non-standard variety, shipped in February from near Boston to Guelph, with at least five express transfers, and yet on the 21st of March hatching 77% of the total eggs set. The result is characteristic of the breed of birds. This question is of vital importance. At present it requires too many eggs set to produce a chick.

Standard Disqualifications.—In view of the fact that we have in Canada several national and provincial programmes of stock improvement and that in connection with all inspection work the American Standard of Perfection is the standard guide, it is of the utmost importance that the greatest possible uniformity of interpretation of the Standard should exist throughout the entire breeding and inspection service. The fact that a great majority of standard disqualifications are known to be definitely inheritable, increases the importance of such standardization of interpretation in relation to this work.

Breeding in Relation to Market Poultry. —In the field of genetics, definite problems in the inheritance of such factors as "fleshing ability" or "body shape as influencing fleshing" are important.

There is a wide variation in the body type of market poultry and probably through extensive breeding for egg production we have lost sight to some extent of the most desirable type in market chickens. Quite a large percentage have deep narrow bodies and consequently are lacking in breast meat and that plumpness so necessary to the production of market poultry. These poorly built birds are difficult and expensive to fatten

under any circumstances and they seldom, if ever, qualify for the top grades.

Studies in breed types and the influence of cross breeding on the economy of meat production are at present being pursued by W. A. Maw. Innumerable problems of relationships of various factors such as : (a) type of male used in the cross, (b) differences between reciprocal crosses, (c) egg size and growth, (d) body maturity influences, and many others on ultimate type and quality of dressed carcass, exist. The variation between the various breeds and crosses as producers of broilers or roasters is another significant problem pointing out the economy of certain types over others.

NUTRITION

The research work in poultry nutrition in relation to hatchability, chick growth, egg production and marketing, which has been done during the past five or six years has been decidedly important and fundamental. The question arises, however, in relation to all this work, whether the results obtained so far can be considered as positive in view of the fact that very little parallel study has been made of the histological, pathological and physiological reactions and the effects of the various diets under study upon the digestive system of the bird. For example, may not some of the recently recognized troubles from cannibalism, feather pulling, paralysis and other nervous reactions, be the result of a pathological condition of the intestinal tract? What is the effect of finely ground fibre on the mucosa of the intestine? Is bulk in the chick ration necessary to develop the organs of the digestive tract, and thereby affect the bird's capacity later to consume and digest feed? What is the effect on the intestines and associated organs of an excess of mineral matter? What is the physical and physiological reaction of the intestine to feed finely or coarsely prepared? What are the reactions or disturbances to other organs in the body resulting from a definite pathological intestinal condition? To what extent is the bird's digestive efficiency lowered as a result of such pathological condition?

It would appear, therefore, fundamental that a more definite histological study is vital in order to first determine in so far as possible the normal condition of the organs and tissues of the body. It is true that this has been done to a large extent on the mammal, and to a limited extent in the bird, but owing to the variations occurring as between the mammalian and avian species further work on the bird is of vital importance. The results of such a study would then permit making the necessary pathological studies which would indicate a favourable or adverse reaction to any dietary tests.

The work carried on at the Ontario Agricultural College at Guelph under the British Empire Marketing Board in co-operation with the Ontario Department of Agriculture, and the work under the Dominion Experimental Farms system, particularly at Ottawa, Charlottetown and Fredericton, have brought out some real fundamental ideas on the effect of the various cereals, the proteins, vitamins and mineral concentrates in the diet in relation to their effect upon hatchability and growth. The work on free choice feeding and the development of the cafeteria rations have opened up some entirely new lines of thought for programmes of further research in relation to the whole problem of nutrition.

The work done at Guelph in the study of turkey production and finishing for market was extremely valuable and some effort should be made to have this work resumed and carried on to more definite conclusions.

GROWTH

Growth factors as they influence the stage of growth at which poultry stock should be finished by fattening for dressing purposes present one of the outstanding economic problems facing the poultryman in determining periods of maximum profit in producing meat. Methods of management of growing stock, such as comparison of range and confinement of growing stock are of importance. A study of feed costs in relation to various stages of growth, such as the broiler stage or the small, medium and large roaster stages, as well as the immature and mature capon, is desirable.

FATTENING

Relatively little investigational work has been carried out dealing specifically with the finishing of poultry for market. The wide variation between individuals in their ability to finish in the fattening process makes necessary a special study of the selection of stock for such work. There is also the problem of the wide variation in individual bird body shape within breeds in relation to what makes a good dressed carcass. The age or size of a bird and its ability to withstand fattening, as well as the economy of fattening at different stages of growth, are of great importance for all phases of marketing, especially when the problem of percentage edible meat on the carcass is also studied. Canners of poultry are especially interested in this phase of study. Confined vs. range stock as economic units in the fattening process is also a definite commercial problem at present.

In the field of nutrition there is need for further study of the common grains in the ration, as well as a study of the varying amounts of animal protein necessary in combination with the cereals, for quality finish. Relatively little work has been done with the problem of definite protein levels in the finishing ration. There is also the need for a study of possible bleaching agents which could be used in connection with the feeding of yellow corn, in order to produce the white finish in fat and skin.

The factor of body weight loss during the early period of feeding, and how it can be most easily overcome, is another problem calling for trials in prefeeding to prevent such losses.

MARKETING

The establishment of definite Government standards, and as a result grade price differentials as established by current market demand in connection with the marketing of our poultry products, has had a vital influence in improving quality and in standardizing the marketing of poultry products throughout the entire Dominion. A recent revision of the egg grading regulations and the simplification of grades based on the results of recent work done by the Live Stock Branch and the National Research Council on egg quality and improved candling equipment—the use of the green light filter—is commendable, and the idea of simplified

grading and standardization of grade terms should be extended throughout the whole programme of grading of agricultural products.

There is still a question in the minds of some as to whether even our present grades are based entirely on actual market quality and food value. For example, what is the fundamental basis of economic quality in eggs? What determines quality in poultry flesh? Is fat the determining factor in flavour and what is the limitation in the amount of fat from an economical standpoint in cooking?

There must necessarily be a co-ordinated study of the value of poultry products from a market or consumer standpoint in connection with the studies on poultry nutrition. Unquestionably appearance, quality and flavour in the product are extensivley influenced by diet. Further, in the handling of market poultry, there is some evidence to suggest that the physical condition of the feed may have a decided influence upon the economy of gain and the grading of the finished market chickens.

The enlargement of our export markets is of vital importance and the exporting of chilled turkeys to the British market during the last two years has relieved the home market of its surplus and greatly stabilized the home market prices. During the present year, there has been a good export demand for frozen chickens and the largest shipments in years have gone forward from Canada to Great Britain. It is estimated that the home market prices have been enhanced two cents per pound as a result of these shipments.[3]

As a result of experimental work undertaken by the Poultry Division, Dominion Live Stock Branch, and the National Research Council, a large defrosting plant has been erected on the Liverpool docks in England to take care of the condensation problem in shipping chilled products. When poultry is taken into a higher temperature than it has been held at in shipping, in transit, or in storage, a heavy condensation, commonly termed sweating, occurs. This condensation interferes with the keeping qualities of poultry, destroys some of its original bloom and detracts from its appearance. By warming the poultry up in a room where the dew point or percentage of moisture is as low as it was in chill or in storage, no condensation occurs and the original bloom of the product is maintained. The condensation room erected in Liverpool is for the convenience and advantage of Canadian shippers at a small nominal fee. The advantages arising out of this innovation in the marketing of dressed poultry, developed through co-operative research, are at once obvious when it is considered that Canadian fresh killed poultry can be marketed in the Old Country with its original bloom maintained.

Other experimental work is now under way at Ottawa to determine the best shipping methods and temperatures to maintian keeping qualities of poultry in transit. The increasing of consumption on our Canadian markets is tied up directly with quality and the top grades are always in demand. We also have a growing demand for our dressed poultry in Great Britain. The demand there is also for quality and, therefore, one of our major problems in maintaining market prices is the production of poultry that will qualify for the highest grades. Shrinkage losses in

[3]Turkeys exported last two years approx. 2,000,000 lbs.
Chickens exported since Jan. 1st, 1934 250,000 lbs.

fattened and unfattened stock, holding temperatures and shrinkage, and preheating and sweating when stock is being removed from the coolers as affecting quality, are factors requiring further study.

Grade price differentials as established by current market demand through the application of Government standards are exerting a tremendous economic influence. The effect of egg grading upon consumption (raising the annual per capita consumption from 17 to 30 dozen in ten years) is well known and is largely the result of removing the question mark from the product. In the more recent regulations applying to poultry meat, the results to date would indicate a somewhat similar reaction. Upward of 500 cars of dressed poultry were inspected during the past fiscal year. During the last fiscal year (1933-34) the percentages of the different grades inspected were approximately as follows: Grade Special, 2.00%; Grade A, 34.05%; Grade B, 49.71%; Grade C, 13.99%; Grade D, 0.25%. For Eastern Canada, the percentages were as follows: Grade Special, 0.09%; Grade A, 40.79%; Grade B, 49.71%; Grade C, 8.96%; Grade D, 0.45%. Grade price differentials are generally established on the following basis:—Grade Special, 1c. or 2c. over Grade A; Grade A, 2c. over Grade B; and Grade B, 3c. to 4c. over Grade C; and the Class Milkfed 2c. more than Class Selected.

HOUSING

It must be admitted that up to the present time there has been practically no systematic study of the important problem of housing. There is a wide diversity of opinion as to what is the most suitable type—or types—of buildings for the housing of poultry. Is the single deck or multiple deck house the more economical and efficient? What should be the method of ventilation and humidity control? What are the optimum requirements in relation to these factors? While it is not suggested that types be standardized, nevertheless it must be admitted that there is much yet to be done in this regard.

SANITATION AND HEALTH

In the field of poultry disease and parasitic infestation we have possibly lagged further behind the general advancements of the industry than in any other phase. In the great majority of cases we find that the poultryman is capable of satisfactorily producing the stock, but due to the inroads of disease and parasites, his profits are entirely lost. It is definitely recognized that the most important factor in the control of such losses, apart from genetic influences, is found in proper attention to sanitation and hygiene. Even, however, under the best of conditions, the poultryman is at times called upon to meet disease outbreaks or parasitic infestations.

DISEASE CONTROL

The use of pox virus in the control of chicken pox is now definitely established as reasonably efficient. For temporary immunity or for use in case of an actual outbreak of chicken pox, the use of pigeon pox virus is advisable. For permanent immunity, the use of fowl pox live virus is preferable, particularly where the vaccinating is done during the midsummer months while the young stock is still on range. It is definitely

established that chicks four weeks of age can be successfully vaccinated, and experimental work is now in progress to determine whether or not vaccination cannot be successfully done on baby chicks. Two methods of vaccinating are of course used with these products, namely, the "follicle method" of vaccinating with the pigeon pox virus and the "stick method" of using the fowl pox vaccine. However, there still remains some work to be done in relation to the use of these vaccines, particularly from the standpoint of strains of virus used in the preparation of the vaccine. As might be expected, there is a wide variation in the immunizing value of these various strains.

Tuberculin testing for avian tuberculósis appears moderately successful where using the avian tuberculin and the interderminal wattle test. This test is now being used more and more each year but should only be used by one fully qualified to apply the tuberculin test.

In the control of fowl cholera, vaccinating appears to have comparatively little value where using the commercial vaccine. In some cases this vaccine appears to have some merit while in other cases it does not produce any reaction whatever. It is possible that the preparation of an autoginous vaccine from the specific infective organism would have more immunizing value. A great deal remains to be done with regard to possible measures of control of this particular infection, which is of extreme economic importance, because of the difficulty of identifying carriers, controlling and eradicating the disease from a plant once the infection has become established.

Pullorum disease, which for the past couple of decades has caused tremendous losses in baby chicks, is now being slowly but surely eradicated from many flocks by means of the blood test. Of the various agglutination blood tests in use at present, the so-called slow tube test is generally considered the most efficient. The rapid serum test and the rapid whole blood test with stained antigen, are being used to some extent, more particularly for the cutting down of the amount of infection in flocks, but depending upon the tube test for the diagnostic test. In many cases we find these tests being used by persons with little or no qualifications, and the result of such practice is to generally discredit the whole pullorum testing programme. Another test which is being used to some extent is the so-called pullorin test, somewhat similar in its application and reaction to the interderminal tuberculin test. Of all the co-called pullorum tests in use at the present time this latter has possibly the lowest efficiency.

There are numerous points relative to each of the above mentioned tests on which further research work is necessary. It would appear, however, highly desirable that so far as the pullorum testing work in Canada is concerned the great need is for a standardization of the testing programmes and the technique used throughout the entire Dominion. Considerable has already been accomplished in a number of the Eastern States and parts of Eastern Canada. It would appear, therefore, that the most logical procedure in connection with this work which has now attained considerable proportions in practically all provinces in the Dominion is that some action towards standardization of cultural strains, antigen preparations, antigen pH reaction and type of test should receive definite attention

and action. It is also important that some control or regulation of the application of the test and some definition of who is qualified to apply it, should be taken.

PARASITE CONTROL

The losses arising, either direct or indirectly, from intestinal parasites is perhaps greater than that occurring as a result of any other form of pathological disturbance in the bird. The losses annually suffered by poultrymen both in the way of actual mortality and of loss in production are enormous. The work that is being carried on at the present time at Macdonald College under the National Research Council is of the utmost importance and value in relation to this problem. It would appear, however, that in view of the tremendous economic importance of the whole question of losses due to parasites more work is necessary in order to bring about better and more adequate measure of control.

It is possibly advisable to keep in mind that there are many other types of infection and infestation which are causing heavy losses and reduced profits in addition to those specifically referred to. As one example coccidiosis, representing infection with one or other of several species each producing more or less specific conditions, is a disease which is possibly of equal importance to any which have been sepcifically referred to previously. This whole question of disease and parasites is one which is becoming of increasing importance and must receive more attention if we are not sooner or later to be faced with the same situation that pertains in some sections of the United States where poultrymen are being gradually forced out of business on account of the tremendous losses from disease and parasites.

In dealing with the question of disease and parasites and their control, and the increasing trouble which is being experienced in controlling such outbreaks, it may be well to keep in mind the possibility of at least some of the trouble being due primarily to pathological intestinal disturbance, the result of the kind, amount, or preparation of the constituents of the diet.

REPORT OF COMMITTEE ON ADVANCED REGISTRATION[1]

CANADIAN SOCIETY OF ANIMAL PRODUCTION—EASTERN SECTION

In presenting a report under the heading of Advanced Registration, your Committee feels that a review of developments to date in Canada is the most useful contribution it can make at this time. Advanced registration, like marketing legislation, has been a subject of much interest and discussion. They have at least one thing in common in that they arise out of a desire to improve existing conditions. Advanced registration has so far found favour with three classes of live stock. Performance records in production and breeding afford a foundation on which to establish it. Were such records available for all classes of live stock presumably some form of advanced registration would develop for many of them, because the inadequacy of present registration provision is generally recognized.

ADVANCED REGISTRY FOR DAIRY CATTLE

At a conference representative of breed associations and producers of dairy products, Federal and Provincial Departments of Agriculture, and Agricultural Colleges held in Ottawa in February, 1924, the Dairy Cattle Committee was appointed to act in an advisory capacity to the Department in regard to a number of recommendations made by the conference.

The first meeting of the committee was held in November, 1924, at which time primary consideration was given to the establishment of Advanced Registry for sires of the dairy breeds, the desirability of such a move having been strongly urged by Dr. Barton, then of Macdonald College, in an address given by him at the time of the conference. It was agreed that the underlying principle of such a service should be the rating as to type and individuality of bulls eligible from the standpoint of production credentials. It was further agreed that in inspecting bulls for Advanced Registration, the standard should be the standard of excellence of the respective breed associations, the understanding being that an animal must score an agreed percentage under each of the main divisions to be eligible.

On November 21, 1924, a meeting of the committee was held, at which representatives of the breed associations were invited to be present. At this meeting the general plan was endorsed and referred to the executives of the several associations for discussion at their respective annual meetings.

When the committee met on March 12, 1925, for the purpose of considering recommendations made by the various breed associations, and to take formal steps for the establishment of the service, it was found that the Holstein-Friesian Association was prepared to support a joint scheme only in the event of R.O.M. records being given recognition on a par with R.O.P. records, and that the majority of the other associations had stipulated against the inclusion of other than R.O.P. records except to a

[1] Dr. H. Barton, Federal Deputy Minister of Agriculture, Ottawa, Chairman; A. W. Peterson, Assistant Chief Field Services, Dominion Live Stock Branch; and R. W. Zavitz, Chief Poultry Inspector, Dominion Live Stock Branch, Ottawa.

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qualified extent. As a result, while the representative of the Holstein-Friesian Association continued to serve on the Dairy Cattle Committee, it was necessary to limit Advanced Registration to bulls of the following breeds: Ayrshire, Jersey, Guernsey, French-Canadian, and Red Poll. A parallel service, known as the Selective Registry Service, was established by the Holstein-Friesian Association for bulls of that breed.

Provision was made by the committee for the immediate establishment of two classes of Advanced Registry bulls:

Class "A"—Commercial bulls, considered primarily as suitable for the establishment of dairy herds.

Class "AA"—Bulls possessing higher qualifications as regards credentials, and rated more strictly as regards type, to be considered primarily as potential herd headers for pure bred herds.

The establishment of a third class, to be known as preferential bulls, and to be limited to outstanding sires which had demonstrated their right to be regarded as specially valuable sources of improvement in the breed, was deferred. The standard as regards eligibility for inspection was modified from time to time as experience proved advisable, and is now embodied in the attached outline.

From its inception, the Advanced Registry Service has been financed through fees for each certificate issued, and by grants received from the supporting breed associations based on their registrations for the preceding year, the maximum grant from any association being $1,000 and the minimum $100. These grants have been supplemented by an annual grant from the Dominion Department of Agriculture. Up to the present time it has been possible to have all inspection work performed by one officer, assisted in the Province of Quebec by a representative of the French-Canadian Cattle Breeders' Association.

In the nine years since the service was established, a total of 3,529 bulls have been admitted to Advanced Registry, 506 being Class "AA". The continued and increasing interest in the service is indicated by the fact that in the calendar year 1933, the number of bulls admitted totalled 689, as compared with 483 for the previous year. The increase in the province of Ontario in 1933 was very noticeable, evidently due to the weight placed upon Advanced Registry qualifications in the administration of the Premium Policy established in that province a year ago.

In the spring of 1931 the Dairy Cattle Committee recommended to the Department the formation of an Advanced Registry Board for Dairy Cattle to definitely administer the service, which by that time was well established. This recommendation was accepted, and the Board now consists of the Deputy Minister, the Live Stock Commissioner, the Assistant Commissioner, the Chief Inspector of the R.O.P. Service, and the secretary of each breed association contributing to the support of Advanced Registration.

The next development in the service will be the establishment of a preferential bull class. At the last meeting of the Advanced Registry Board, the desirability of taking final steps to establish such a class was discussed at length, and it was agreed that the Deputy Minister should act as chairman of a sub-committee to be named by himself, this sub-committee to draft standards for this class.

ADVANCED REGISTRATION

Certificates Issued by Provinces

	Report No. 4, January 1, 1932 (18 months)	Report No. 5, January 1, 1933 (12 months)	Report No. 6, January 1, 1934 (12 months)
Prince Edward Island	34	19	9
Nova Scotia	40	34	22
New Brunswick	25	15	15
Quebec	240	306	341
Ontario	90	62	255
Manitoba	2	2	5
Saskatchewan	5	3	6
Alberta	9	8	7
British Columbia	15	34	29
	460	483	689

Number of Certificates Issued from Beginning up to January 1, 1934

	"AA"	"A"
Ayrshire	277	1,787
French Canadian	54	341
Guernsey	39	235
Jersey	105	520
Red Poll	2	—
	477	2,883

STANDARDS GOVERNING ADMISSION TO ADVANCED REGISTRATION

1. The bull must be already registered in the Canadian National Live Stock Records.

2. All scoring must be done by an inspector appointed by the Advanced Registry Board.

CLASS "A"

1. The minimum standard as regards credentials under which bulls will be eligible for inspection for Class "A" registration will be as follows:—

(*a*) The bull must be out of a record dam.

(*b*) His sire must be at least by a qualified sire or out of a record dam.

2. The bull must score at least 75% in each of the main divisions of the scale of points of the breed to which he belongs.

3. He must not be under eight months of age at time of inspection.

CLASS "AA"

1. Unless he has already qualified in the Record of Performance, a bull must have the following credentials as regards production.

(*a*) His sire must be either a Record of Performance bull, an "AA" bull, or a preferential bull, and

(*b*) his dam must have a record one-third above the standard for qualification, or

(*c*) his dam must have at least three records exceeding the standard by margins which when aggregated are at least one-third in excess of the average standard for qualification of the three terms included.

2. (a) His dam must score an aggregate of at least 85% of the scale of points of the breed to which she belongs, or

(b) at least four of his daughters none of which are to be younger than approaching first lactation period must pass inspection on the basis indicated in 2 (*a*).

3. (*a*) The bull himself must score an aggregate of at least 85% of the scale of points of the breed to which he belongs except

(b) when four of his daughters are already passed on the basis indicated in 2 (*b*) in which case an aggregate of 75% on his own score will be sufficient to pass the bull.

4. The bull must not be under twenty months of age at time of inspection.

In addition to the foregoing requirements, the following rules will apply for both Class "A" and Class "AA." Ayrshire bulls:—

1. No bull born on or before December 31, 1931, shall be eligible for Advanced Registry Inspection unless his dam shall have given an average test of 3.80 per cent butterfat, or more, in any one of her lactation periods.
2. No bull born on or after January 1, 1932, shall be eligible for Advanced Registration unless his dam shall have given an average test of 4 per cent butterfat, or unless his dam shall have given an amount of butterfat that is twenty-five per cent in excess of the amount required to qualify in any one of her lactation periods, but providing that her average test is not less than 3.80 per cent butterfat.
3. Unless an R.O.P. bull is eligible through his sire and dam he will not be eligible for Advanced Registry Inspection unless four of his daughters, each from a different dam, have records which make them eligible to be the dams of Advanced Registry bulls.

CERTIFICATE

The certificate of Advanced Registration which is issued by the Advanced Registry Board will be in the form of a diploma. By arrangement with the Canadian National Live Stock Records, the regular certificate of registration for each bull admitted to Advanced Registration is conspicuously stamped to indicate his new status, and his class, A.R. No. and tattoo marks are added. In addition, the registration certificate of each of his progeny to the second generation recorded in future carries his A.R. No.

ADVANCED REGISTRY FOR PURE BRED SWINE

Previous to the year 1928 pig testing was something which swine breeders of Canada had heard about from Denmark where testing stations and breeding stations have been standard equipment for about forty years. In Canada we had a definitely organized system providing for the purchase and sale of commercial hogs according to quality; we had numerous extension policies for the improvement of our swine; we had the show ring and the individual judgment of professional men and breeders, but no measuring stick of any kind by which to gauge the actual commercial value of our breeding stock. It is admitted that there are valuable aspects of show ring competition. The show ring, however, does not place values upon the commercially important factors of production capacity, economy of gains and carcass quality. The breeding of pure bred hogs and the breeding of commercial hogs, closely interdependent as they should be,

were, under our system of establishing values, divorced from each other to a considerable degree.

As a result of this condition it was felt by some of those who were in close contact with every phase of the swine industry that there was need for a basis of testing which would provide for the breeders of pure bred swine an opportunity to test their pigs from the above mentioned commercial standpoints. In 1927 the Joint Swine Committee recommended that a system of Advanced Registry be established, and after considerable study of methods already in operation in other parts of the world, a policy which was considered applicable to Canada was evolved and has been from its inception administered by the Live Stock Branch of the Dominion Department of Agriculture, with the advice of a body representative of the swine industry throughout Canada known as the Advanced Registry Board for Swine.

The Advanced Registry Policy provides for the testing of sows registered with the Canadian National Live Stock records. Sows, to qualify, must obtain minimum scores for size of litter, and for rate of gains and carcass quality as determined by the performance of four pigs in the litter. Boars, to qualify, must sire the pigs of at least three litters which qualify their dams. To date 347 sows have qualified out of a total of 720 completing the test, or 48%. Forty-four boars have been qualified.

During the first year of the application of this policy, entrants were limited very largely to the herds of our Experimental Farms and other public institutions. Since that time there has been a gradual growth in the number of entrants as indicated by the following figures:—

1929	1930	1931	1932	1933	1934
32	61	101	144	166	220

The attitude of our swine breeders towards this undertaking has been rather interesting. To the breeders of pure-bred swine who were not actively interested in catering to the show ring, the policy immediately appealed. To those breeders who had always been prominent in our larger shows, the policy cannot be said to have appealed until quite recently. Official approval of the Canadian Swine Breeders, although never definitely sought, was secured at a meeting of the Canadian Swine Breeders' Association held at Winnipeg in 1933. At that meeting a resolution was passed endorsing Advanced Registry as a valuable aid in breeding, and requesting the Canadian National Live Stock Records to include information from the Advanced Registry records on the pedigree certificate. Action was taken by the Record Board and at the present time the scores of all qualified sows are included in the Canadian National Live Stock Record for swine. The Advanced Registry number allotted to qualified animals is shown on the pedigree certificate and duplicate certificates showing the scores may be secured for sows as they qualify.

Critics of Advanced Registry for Swine have maintained that under its provisions the skill of the feeder might possibly be a bigger factor in qualifying a sow than the inherent qualities of the sow herself. The Advanced Registry Board realized the validity of this contention and for the past two years has investigated plans whereby the four pigs destined for slaughter of sows entered could be fed standard feeds under uniform

conditions at various centres across the Dominion. At a meeting held at Ottawa last February of an enlarged Board representing a broader cross-section of our swine industry the whole question was thoroughly discussed and the Board recommended the establishment of feeding stations.

The organization suggested for conducting the feeding stations provides for the establishment of Provincial Committees, the functions of which are to supervise the location and establishment of stations and to provide the necessary management. These Committees are responsibe to the Advanced Registry Board, which body, with the approval of the Department of Agriculture, lays down regulations governing standard practices, feeds, etc., and issues credentials. Eventually the machinery set up should provide a sufficient number of stations for the testing of all sows offered; for this year, however, four only will be operated, one each in the Provinces of Prince Edward Island, Quebec, Ontario and Saskatchewan.

Possibly less is known in swine than in other classes of live stock with respect to the inheritance of the various important characters. Certain qualities, however, are definitely required by the farmer producing hogs for a living. He needs sows which will wean large litters consistently year after year. The cost of feed being the largest item of expense in connection with hog production, he must have pigs which will make economical use of feeds available. There being definite differences in market value based on the type and quality of the pig produced, he must have pigs which will produce a carcass of high commercial value. Our knowledge of swine genetics can hardly be claimed to have reached the stage whereby it can tell us how to produce such a pig. By testing successive generations this knowledge will be provided in concrete form—the improved pig itself. In the process the data collected should yield the story of the genetics involved in obtaining that result.

It is already possible as a result of testing to date to isolate certain strains which are consistently good and others which are consistently bad. The breeder can, by testing, supplement his own judgment of values of individuals in his herd. Our pedigree certificates today, instead of being a tabulation of names and numbers only, may be a record of performance as well, and prices paid at recent sales for animals with good records behind them indicate a practical appreciation of the value of pig testing.

PROGENY TEST PROPOSED FOR POULTRY

Poultry, by reasons of the numbers involved, the low unit cost and the rapidity of reproduction lends itself to at least two forward steps in breeding to which considerable thought has been given. First: the inclusion in the breeding programme of more, ultimately all, of the quality characters found genetically sound and required in the finished product in both poultry and eggs. Second: the stimulation of research to ascertain which quality characters are inherited and if possible how.

To date in the breeding policies only the number and size of eggs and standard requirements of the individual have been taken into consideration. There are at least ten additional characters in egg quality and six in market meat quality as well as considerations of longevity, fecundity and hatchability, which should be taken into consideration when practicable.

For thirteen years Canada has had two poultry breeding policies—Registration and R.O.P. Both have certain similar standards of qualification, taking into consideration breed type, records of production, egg weight, method and supervision of pedigree breeding. Both policies, working along these lines, have achieved good results. Flock averages in Contests and in R.O.P. flocks have reached a point around 160–170 eggs, beyond which they do not rise. Both have apparently reached their limit of production improvement with present breeding methods. The breeders have been following the usual practice of mating together the best producers, with little recognition of progeny testing in the genetical sense.

Recently the Dominion Poultry Board recommended that the desirable features of existing policies be developed into a broader, more comprehensive and more scientific programme to include: the widest possible sources for testing stock, recognition of merit on a generation basis, recognition only of sound pedigrees, inclusion of additional worth while characters as basis of qualification, advanced recognition of established prepotency, and provision for the widest possible dissemination to the farms of Canada of the blood lines established.

This programme naturally divides itself into two parts:—

1. The standards of production or qualification.
2. The recognition of prepotency in males and females.

It has recently been shown that only when the seven nearest dams of both the sire and dam have laid 200 or more eggs averaging 2 oz. each, is there a significant correlation between the dams' production and that of the progeny. A study of pedigrees under present breeding policies showed that over 50% of the birds for which pedigrees were available, were sound 200 eggs, 2 oz. average weight -for at least three generations, and further work is being done with a view to providing a sound foundation for progeny test work.

It is proposed to progeny-test qualified birds in order to segregate the truly prepotent, valuable breeding individuals. It is also proposed to make genetical studies of these results with a view to giving further direction in breeding and possible recognition of flocks which are found to have a high average of prepotency.

In such a plan the object would be not the creation of a few extremely high record individuals, valuable as they are, or even the development merely of high record families, but rather to breed individuals that will produce heavily in flock units with little culling and selection, and with their vitality, stamina and inherited production ability so definitely fixed in the entire strain that they will reproduce their kind in large number for commercial purposes.

LA PRODUCTION ANIMALE EN FRANCE ET LES RACES D'EXPORTATION[1]

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Pour saisir les caractéristiques de la production animale en France, il est indispensable d'avoir une idée nette du milieu dans lequel elle se réalise. Ce qui frappe essentiellement, à l'examen de notre pays, c'est son infinie variété.

Tous les étages géologiques semblent s'être donné rendez-vous en cette extrémité de l'Europe. Les terrains primitifs, les éruptifs, toute la gamme des terrains sédimentaires, du cambrien au pléistocène, sont représentés sur des superficies plus ou moins vastes. Le relief a été dessiné par les principaux plissements de l'écorce terrestre, du système hercynien et du système alpin. D'une part, des montagnes très usées, de faible altitude, de l'autre, des sommets très élevés atteignant tout près de 5000 mètres.

Enfin, le climat est lui-même très divers. Si l'ensemble de la France est soumis au régime océanique, en certains points se fait sentir l'influence méditerranéenne, en d'autres, par contre, règnent des écarts de température comme au centre des continents. De là, une multiplicité de "pays", ayant leur caractère propre—et la multiplicité aussi des races de bétail.

L'introduction de certaines races étrangères est venue encore accuser la diversité de physionomie de l'élevage en France: Shorthorn, Frisonne, Simmenthal, Schwitz, pour l'espèce bovine; Yorkshire pour l'espèce porcine; Mérinos, Leicester et Southdown pour l'espèce ovine, sont utilisées pures, ou bien ont servi à réaliser des races aujourd'hui bien fixées, comme Maine-Anjou, et Armoricaine, Charmoise et Ile de France, etc.

Malgré le tempérament particulariste du Français, et l'attachement à ses habitudes, il y a néanmoins tendance à l'heure actuelle très nette à plus d'homogénéisation dans le bétail entretenu, du fait de la spécialisation des races vers laquelle on tend.

Les races à aptitudes mixtes d'autrefois font place aux races de gros trait, laitières, à viande, à laine, etc., et prennent justement plus d'expansion, celles qui sont les plus améliorées, capables de s'adapter à des conditions de milieux diverses et dignes d'être exportées.

Examinons rapidement les races qui ont à l'heure présente le plus tendance à affirmer leur supériorité.

Chevaux.—Autrefois, lorsque le service de remonte de l'Armée procédait à des acquisitions importantes, et avant la vulgarisation de l'automobile, étaient nombreux les chevaux de selle et de trait léger, appartenant aux races de Pur-sang, Anglais, Anglo-Arabes, de Demi-sang, Anglo-Normand, Cobs, Postiers etc. Aujourd'hui prédominent les races de chevaux de trait lourd, les Percherons, entretenus dans le centre de la France, les Boulonnais, dans le Nord, les Bretons, dans l'Ouest, les Ardennais, dans l'Est. L'effectif de la population chevaline est de l'ordre de 3 millions d'individus environ.

[1]Sommaire de la conférence faite au Collège Macdonald le 27 juin 1934, par M. Paul Thiéry, Délégué du Ministère français de l'Agriculture.

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Bovins.—Les races de travail sont entretenues dans les régions où l'Agriculture est la moins évoluée, ou tout au moins là où la petite culture domine essentiellement. Notons: la Parthenaise, dans l'Ouest, la Garonnaise et la Gasconne, dans le Sud-Ouest et le Midi. Trois races sont surtout exploitées en vue de la production de la viande: la Charollaise, dans le centre, la Limousine, plus localisée, à l'Ouest du Plateau Central et la Maine-Anjou qui résulte d'un croisement avec Shorthorn, dans l'Ouest.

Quant aux races laitières, elles comprennent: la Normande, abondamment diffusée sur un quart du territoire, la Tachetée de l'Est, dérivée du Simmenthal, qui occupe une superficie de territoire comparable, la Flamande, dans le Nord, et enfin Frisonne et Schwitz réparties en divers points.

Est-il besoin de dire que la spécialisation des races bovines n'est jamais quand même très nettement prononcée, ne serait-ce que parce que la fin de toute bête est la boucherie? Ainsi, la Parthenaise est une bonne laitière, au lait riche en matière grasse, Charollaise et Limousine sont employées pour le travail, la Normande enfin, est une remarquable productrice de viande. Au total, le troupeau bovin français, en voie d'accroissement, atteint environ 16 millions de têtes.

Moutons.—Autrefois dits bêtes à laine, parce qu'élevées surtout pour leur toison, les moutons ont, aujourd'hui surtout, d'autres fins, en raison de la baisse du prix des matières textiles.

Nous entretenons toujours de vieilles races, à aptitudes mixtes comme la Berrichonne, diffusée dans le centre et la région parisienne, où elle sert au croisement industriel, et aussi des laitières, comme Caussenarde, de Larzac, de Lacaune, répandues dans les régions où se fabrique le Roquefort.

Certains types sont spécialement recherchés pour la production de la laine. Dérivés du mérinos de Rambouillet, leur structure a été améliorée en vue de la production de la viande, et nous avons ainsi les mérinos d'Arles, du Soissonnais, de Champagne et de Bourgogne. Une race importée s'est beaucoup diffusée, c'est la Southdown.

Enfin, certaines races réalisées par croisements et bien fixées, prennent beaucoup d'expansion, remarquablement construites qu'elles sont pour la production de la viande: c'est la Charmoise et l'Ile de France (ou Dishley Mérinos).

Dans son ensemble, le troupeau de moutons a une tendance très nette à diminuer d'importance. La dépécoration sévit pour de multiples raisons et l'effectif ovin atteint à peine dix millions de têtes.

Les Porcins.—En matière production porcine, l'éleveur français cherche de plus en plus à obtenir des animaux susceptibles d'être abattus, au plus tard à 5 ou 6 mois, pesant alors une centaine de kilogrammes, et offrant le minimum de graisse de couverture. De veilles races autochtones, très améliorées, conviennent bien à cette spéculation: ce sont la Craonnaise et la Limousine. Mais l'on exploite aussi beaucoup de races importées, et notamment Middle-White, plus encore la Large White. Très souvent enfin est réalisé avec succès le croisement de races françaises par les anglaises.

L'ÉLEVAGE ET LES POUVOIRS PUBLICS

Dans le domaine de l'espèce chevaline, l'Etat intervient très activement, et l'amélioration des races est pour ainsi dire dirigée. Un étalon qui fait la monte publique doit être soit autorisé, admis comme tel s'il

ne doit pas amoindrir les qualités de la race, soit approuvé, lorsqu'il peut au contraire les améliorer. D'importantes primes d'approbation sont accordées chaque année.

Mais l'Etat intervient d'une façon plus directe encore par les étalons qu'il possède dans ses haras, et met à la disposition des éleveurs, durant la saison de monte, à des tarifs très réduits.

Le Ministère de l'Agriculture tient lui-même le Stud-Book du Pur-Sang, aide au fonctionnement des autres livres généalogiques, tenus par des associations indépendantes et organise chaque année de nombreux concours, dont le Concours Central Hippique qui réunit à Paris les représentants de toutes les races françaises.

Dans le domaine de l'Espèce bovine, l'amélioration demeure libre bien que de nombreux projets de réglementation de la monte des taureaux aient été présentés. Mais les Pouvoirs publics interviennent néanmoins d'une manière très active. D'abord par l'organisation annuelle des concours spéciaux de races et du Concours Général agricole de Paris, largement dotés de prix. Puis en favorisant le développement des syndicats d'élevage qui, en France, jouent un rôle de premier plan dans la production animale.

Le syndicat d'élevage le plus recommandable est celui qui, groupant un petit nombre d'adhérents, rayonnant sur une faible surface, est devenu propriétaire de taureaux inscrits au livre généalogique de leur race. Grâce à cette formule, le petit éleveur peut disposer d'excellents animaux reproducteurs au même titre que ceux à la tête d'une importante étable. Le taureau est acheté en commun soit après emprunt au Crédit Agricole, soit avec les versements des adhérents; puis il est confié à l'un des éleveurs qui l'entretient moyennant rétribution et recueille le montant du prix des saillies pour le compte du syndicat.

Les syndicats d'élevage se groupent en fédérations régionales dont l'activité s'exerce sur des points multiples, mais dont une des raisons principales d'existence doit être la tenue des livres généalogiques.

Le Ministère de l'Agriculture aide beaucoup naturellement les Herd-Books, qui sont gérés par des associations privées. Suivant les races, les livres sont fermés ou encore ouverts. Ces derniers font encore des inscriptions au titre initial, mais surveillent aussi la sincérité des déclarations de naissances, exigent les déclarations de saillies, et confirment, s'il y a lieu, l'inscription des animaux déclarés au titre de l'origine.

Indépendamment des livres généalogiques, les associations d'éleveurs tiennent des livres zootechniques ou d'aptitudes, d'après les résultats du contrôle laitier, et de là découle aussi la tenue des livres d'élite, complément logique des Herd-Books.

La pratique du contrôle laitier se heurte en France à quelques difficultés pratiques, notamment la division des exploitations, et l'habitude de laisser le veau têter sa mère. Grâce aux encouragements de l'Etat, néanmoins, il prend une extension chaque jour plus grande.

Espèces ovines et porcines sont encouragées comme les deux autres. Les concours d'animaux sont complétés par des concours de bergeries et de porcheries. Mais le syndicat d'élevage s'est là beaucoup moins développé. Les livres généalogiques sont aussi moins nombreux, il y a néanmoins des

Flock-Books et des Pig-Books pour les races principales de moutons et de porcs.

L'intervention de l'Etat se manifeste encore dans le domaine de la production animale par la sauvegarde de la santé du bétail. La plupart des départements sont dotés d'une direction des services vétérinaires qui, avec la collaboration des vétérinaires praticiens, assure la police sanitaire et prend les mesures prophillactiques désirables pour éviter la propagation des épizooties.

LES RACES FRANÇAISES SUSCEPTIBLES D'INTÉRESSER LE CANADA

Espèce Chevaline.—La race Percheronne est déjà si connue au Canada qu'il doit y avoir bien peu à dire sur son compte. Est-il nécessaire de rappeler que les animaux y appartenant sont vraisemblablement dérivés de l'Arabe? Du cheval de selle dont certaines qualités ont été conservées, on est passé peu à peu au cheval de trait d'aujourd'hui. Le Percheron est un cheval de grande taille, de robe grise, pommelée, ou noire, d'allure souple et légère, doux et intelligent.

Bornons-nous à signaler les points caractéristiques de sa structure: sa tête au chanfrein droit et plat, son encolure ample et rouée, ses hanches longues, sa croupe presque horizontale et légèrement fendue, sa taille: Im. 65 en moyenne (5 pieds anglais).

A côté du gros Percheron, citons le type postier, d'un format moindre et qui ne dépasse pas Im. 60 au garrot.

Les aptitudes du Percheron: vigueur, rusticité, tempérament, ont permis son exportation dans le monde entier, et il semble qu'il fasse excellente figure au Canada.

Le Stud-Book percheron qui fonctionne avec beaucoup de sévérité est fermé depuis plus de 40 ans. Si l'influence de la race se fait sentir sur une grande partie de l'élevage chevalin français, c'est le Perche lui-même, petite région de France, au Nord de la Loire, qui réalise les meilleurs reproducteurs. Le naisseur, petit éleveur, vend généralement, vers l'âge de six mois, après sevrage, les poulains qui se développent chez les herbagers. A 18 mois, suivant leur qualité, les étalons seront ou des sédentaires ou des rouleurs.

Les prix de saillies exigés sont souvent considérables, en rapport avec la valeur exceptionnelle de ces animaux.

La Race Bovine Normande.—Elle peuplait autrefois, sous différents noms, la seule Normandie, c'était la Cautentine, l'Augeronne, la Viroise, etc., groupant en réalité des animaux d'un même type. Sanson rattachait la race Normande à la souche germanique caractérisée par la dolychocéphalie. De fait, si la face est courte le crâne est haut. Un détail bien caractéristique est le "coup de point" entre les yeux. Signalons encore le mufle large, les yeux saillants, les cornes à section circulaire, installées dans un plan horizontal.

Le corps de la Normande, dont l'aptitude est mixte, est ramassé. La poitrine est ample et profonde, la côte est ronde, la croupe est large. Si le cuir est épais, il est par contre très souple. Les muqueuses sont dépigmentées et la robe, caille rouge, caille blonde, est généralement bringée, c'est-à-dire, zébrée de bandes noires plus ou moins régulières.

Il y a cinquante ans que furent groupés les divers types de Normandes, en vue de la création d'un Herd-Book commun organisé par l'Administration préfectorale du Calvados. En 1920, le Livre généalogique fut confié à une association privée. La race est maintenant en pleine expansion et le troupeau normand compte aujourd'hui plus de 3 millions de têtes, le $\frac{1}{8}$ du troupeau français.

Le Herd-Book normand inscrit encore des animaux au titre initial lorsqu'ils en sont jugés dignes. Les mâles doivent être âgés de un an et les femelles avoir mis bas.

Pour assurer les inscriptions au titre de la descendance, l'éleveur doit faire la déclaration de saillie dans les six mois et la déclaration de naissance dans les 15 jours. Un signalement minutieux du veau est donné à cette occasion. Les effectifs inscrits, vivant à l'heure actuelle, sont de 35,000 têtes, dont $\frac{1}{10}$ de mâles, répartis entre 7,000 adhérents. Plus de 140.000 animaux ont figuré au livre généalogique depuis sa fondation.

Le contrôle laitier dont la pratique est mensuelle, est effectué par des syndicats spéciaux exerçant leur action sur 10,000 vaches. Les contrôleurs passent à l'improviste, font les analyses, soit par la méthode Hoyberg (réactif alcalin), soit par la méthode Gerber (réactif acide) et ont le soin de donner des conseils sur l'alimentation du bétail lorsqu'ils remarquent que celle-ci n'est pas convenablement réalisée.

Le contrôle laitier décèle des rendements remarquables, dépassant en 300 jours, 6,000 Kgs de lait et 280 Kgs de beurre, pour des vaches de moins de 5 ans, et atteignant 9,000 Kgs de lait et 400 Kgs de beurre pour des femelles adultes. Les productions oscillant entre 6 et 7,000 litres sont très fréquentes pour une production de beurre de 400 Kgs.

Il était donc logique pour le Herd-Book d'aboutir à la création d'un livre d'élite qui fonctionne aujourd'hui régulièrement depuis juin 1930. Pour inscrire un animal à ce livre, on tient compte de ses origines, de sa conformation, de ses aptitudes beurrières. Une table de pointage est en usage qui prévoit les coefficients suivants:

—	Mâles	Femelles
Pureté de race et robe	4	4
Conformation	4	3
Finesse	2	2
Mamelle	–	1
	10	10

Un total de 80 points est nécessaire à l'inscription.

En outre, le taureau doit avoir dans sa famille six femelles à gros rendement, c'est-à-dire, qui ont donné en 300 jours au moins 180 Kgs de beurre, si elles ne sont pas encore adultes, 200 Kgs si elles le sont. Ces femelles seront ses filles ou ses sœurs de père.

De telles conditions, très sévères, font que le nombre des taureaux inscrits au Livre d'Elite n'est encore que de 5. Les femelles par contre, inscrites lorsqu'elles ont donné les rendements indiqués tout à l'heure, sont au nombre de 500.

En attendant que plus de mâles puissent figurer au Livre d'Elite une formule transitoire est en application, se traduisant par la désignation de taureaux recommandés. Un animal bénéficie de ce titre lorsque, groupant

80 points, il est fils d'une grande beurrière, inscrite elle-même au Livre d'Elite.

En raison de ses remarquables aptitudes à donner du lait, du beurre, de la viande, des veaux renommés, la race normande a pris de l'expansion non seulement en France, mais dans de nombreux pays étrangers. En Europe, l'Italie et l'Espagne s'intéressent à elle. En Amérique, l'Argentine, l'Uruguay, le Chili, le Brésil, le Guatemala viennent fréquemment procéder à des achats. Plus de 200 têtes sont expédiées chaque année. Fait remarquable et qui dénote ses facultés d'adaptation, les Normandes, nées en Amérique du Sud, rivalisent souvent dans les concours avec celles qui viennent d'y être importées.

Les prix modérés pratiqués doivent enfin, semble-t-il, favoriser des courants d'exportation puisque les génisses de 18 mois se vendent 3,000 frs environ, les taureaux de 12 mois, 5 à 6,000 auxquels il suffit d'ajouter 3,000 frs par tête pour tous frais de port et d'assurance.

Les Races à Viande Charollaise et Limousine. Deux races françaises remarquablement constituées pour la production de la viande sont également capables d'exportation et de fait, très demandées elles aussi dans l'Amérique du Sud.

La CHAROLLAISE, brachycéphale, se rattache au type jurassique. Les animaux de cette race ont la robe uniformément blanche et les muqueuses roses. De grand format, les femelles atteignent 700 Kgs et les mâles souvent plus de 1,000.

La LIMOUSINE, dolychocéphale, est apparentée au type d'Aquitaine. La robe est froment plus ou moins foncé, allant jusqu'au rouge chez les mâles, mais les muqueuses sont dépigmentées. Les femelles pèsent en moyenne 500 Kgs et les mâles 800 et plus.

Si elles sont de formats différents, Charollaise et Limousine sont merveilleusement conformées l'une et l'autre avec un corps très puissant, une culotte accentuée et très descendue. La viande fournie en outre, finement persillée, est de toute première qualité.

Voilà rapidement présenté un schéma de la production animale française. Si certaines de nos races ne peuplent que de petites parties de notre territoire, d'autres, au contraire, ont des facultés suffisantes pour intéresser l'étranger et attirer son attention. Nous souhaitons vivement que le Canada veuille bien les mettre à l'épreuve: il en tirera peut-être les conséquences les plus heureuses en ajoutant une parure au magnifique élevage qu'il a su déjà réaliser.

THE ECONOMIC SITUATION

PREPARED IN THE AGRICULTURAL ECONOMICS BRANCH, DEPARTMENT OF AGRICULTURE, OTTAWA, LARGELY FROM BASIC DATA COLLECTED BY THE DOMINION BUREAU OF STATISTICS

The index of wholesale prices in Canada receded from 72.3 in August to 72.0 in September. Lower sub-indexes were recorded for vegetable products; fibres, textiles and textile products; wood, wood products and paper; iron and its products and non-ferrous metals. Higher indexes were registered for animals and their products; non-metallic minerals and chemicals and allied products. During the first nine months of 1934 the index of wholesale prices averaged 71.7 compared with 66.7 during the same period last year.

Retail Prices.—Retail prices advanced slightly in September, the index rising to 79.0, whereas it was 78.5 in September, 1933. The index of prices of food declined from 69.3 in August to 68.8. Advances were registered in the indexes of fuel, clothing and sundries, but the rise in the clothing index may be due to quarterly revision.

Employment.—The employment index (1926 = 100) was 100.0 as at October 1 compared with 98.8 at September 1. Taking employment by industries the indexes at the foregoing dates were manufacturing 94.4 and 94.3; logging 113.4 and 85.6; mining 117.9 and 112.4; communications 81.3 and 82.5; transportation 84.8 and 83.6; construction and maintenance 117.0 and 118.1; services 116.2 and 125.5; trade 120.0 and 117. This is a very satisfactory situation.

Physical Volume of Business.—The physical volume of business showed some contraction in September. The index stood at 99.0 in August which represented a sharp increase. Moreover in the month of September, a thirty-day month, there were five Saturdays and five Sundays which would affect the number of days work and therefore the index. Under these conditions it is not surprising that there was a recession. Industrial production dropped to 97.5. In the manufacturing group food stuffs made a substantial gain. Iron and steel production was well maintained. Indexes of exports and imports were higher. Electric power output showed less than the normal gain. Car loadings showed an increase but it was less than is usually the case at this season of the year. Tobacco releases, production of newsprint, lumber and automobiles were lower than in the previous month. Bank debits declined moderately. The construction index was 41.3. Contracts awarded showed a gain, but building permits were lower than in August. Agricultural marketings were lower than in August largely because of a less than normal movement of grain which more than offset an increase in shipments of live stock. Taking the long time view the situation is more reassuring in that the index of the physical volume of business averaged 94.0 in the first nine months of 1934 compared with 77.4 in the same period in 1933.

Agricultural Products.—The index of wholesale prices of Canadian farm products receded from 61.6 in August to 61.3 in September. The average price of No. 1 Manitoba northern wheat was 82.3 cents in September, whereas in August it was 86.0 cents. Wheat prices declined because of a weakened demand in Europe, fairly large supplies from Argentina and the volume of lower grade wheat offered by France at comparatively low prices. The wheat situation shows improvement over a year ago but so far it has not been as great as was anticipated earlier in the crop year. There was a substantial activity in oats at somewhat higher prices and there was an advance in prices of barley but returns for rye and flax were lower. The index of prices of animal products rose from 63.1 to 65.3. This index was affected more by advances in prices of eggs, milk, hides and skins than by the lower price for live animals, particularly steers and lambs.

ANNUAL AND MONTHLY INDEX NUMBERS OF PRICES AND PRODUCTION COMPUTED BY DOMINION BUREAU OF STATISTICS

Year	Wholesale Prices 1926 = 100				Retail prices and cost of services (5)	Production (6) 1926 = 100			
	All commodities (1)	Farm products (2)	Field products (3)	Animal products (4)		Physical volume of business	Industrial production	Agricultural marketings	Cold Storage holdings
1913	64.0	62.6	56.4	77.0	65.4				
1914	65.5	69.2	64.9	79.0	66.0				
1915	70.4	77.7	76.9	79.2	67.3				
1916	84.3	89.7	88.4	92.3	72.5				
1917	114.3	130.0	134.3	119.6	85.6				
1918	127.4	132.9	132.0	134.7	97.4				
1919	134.0	145.5	142.4	152.5	107.2	71.3	65.5	48.1	47.1
1920	155.9	161.6	166.5	149.9	124.2	75.0	69.9	52.6	94.2
1921	110.0	102.8	100.3	108.5	109.2	66.5	60.4	65.2	86.4
1922	97.3	86.7	81.3	99.1	100.0	79.1	76.9	82.6	82.8
1923	98.0	79.8	73.3	95.1	100.0	85.5	83.8	91.4	87.6
1924	99.4	87.0	82.6	97.2	98.0	84.6	82.4	102.5	114.9
1925	102.6	100 4	98.1	105.7	99.3	90.9	89.7	97.2	108.6
1926	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1927	97.7	102.1	99.9	105.7	98.4	106.1	105.6	103.6	110.0
1928	96.4	100.7	92.6	114.3	98.9	117.3	117.8	146.7	112.8
1929	95.6	100.8	93.8	112.5	99.9	125.5	127.4	101.1	109.6
1930	86.6	82.3	70.0	102.9	99.2	109.5	108.0	103.0	128.4
1931	72.2	56.3	43.6	77.6	89.6	93.5	90.4	99.0	125.7
1932	66.7	48.4	41.1	60.7	81.4	78.7	74.0	114.3	120.1
1933	67.1	51.0	45.8	59.6	77.7	79.7	76.8	105.1	115.4
1933									
Jan.	63.9	43.6	35.1	57.9	79.1	68.1	62.2	56.1	112.0
Feb.	63.6	43.0	36 0	54.7	78.4	67 0	60.0	76.5	127.6
Mar	64.4	44.7	38 0	56 0	77.8	68.4	62.5	129.0	135.8
April	65.4	46.8	41.1	56.4	78.0	69.8	65.1	104.1	112.7
May	66.9	51.2	46.9	58.4	77.0	76.4	72.7	95.4	110.4
June	67.6	52.6	49 4	57 9	77.0	82 2	79.8	221 9	119.9
July	70.5	60.1	60.8	59.0	77.2	84.1	82.6	221.9	119.9
Aug.	69.4	57.0	54 9	60.5	78.6	89.8	89.5	197.2	114.2
Sept.	68.9	54.7	49.5	63.4	78.5	90.8	90.2	101.1	115.7
Oct.	67.9	51.4	44.6	62.8	77.9	88.2	87.4	70.5	112.7
Nov.	68.7	53.8	46.7	65.8	78.1	85.5	83.9	41.8	111.1
Dec.	69.0	53.3	45.3	66.6	78.4	86.2	85.1	30.7	107.6
1934									
Jan.	70.6	55.3	47.9	67 8	78 2	86.8	84.5	48.2	108 1
Feb.	72.1	58.0	49.3	72.5	78.7	86.4	84.0	67 1	98.6
Mar.	72.0	56.5	49.5	68.3	79.9	93.1	92.0	63.8	97.0
Apr.	71.1	55.4	48.7	66.6	79.4	92 6	91 4	56 9	94.5
May	71.1	56.9	51.1	66.5	78.5	99.6	99.4	130 6	102.6
June	72.1	59.3	55.5	65.6	78.2	95.8	95.2	97.2	126.1
July	72.0	60.0	57.8	63.7	78.4	95.7	95.6	148.8	116.3
Aug.	72.3	61.6	60.7	63.1	78.7	99.0	99.8	172 8	114.7
Sept.	72.0	61.3	58.9	65.3	79 0	97.1	97.5	127.7	117.7

1. See Prices and Price Indexes 1913-1928, pp. 19-21, 270-289 and 1913-1931, p. 15.

2. Wholesale prices of Canadian products of farm origin only. See Prices and Price Indexes 1913–1931, p. 33, and Monthly Mimeographs 1933 and 1934.

3. Wholesale prices of grains, fruits and vegetables.

4. Wholesale prices of Animals and Animal Products.

5. Including foods, rents, fuel, clothing and sundries. See Prices and Price Indexes 1913-1928, pp. 181-185, 290-293. 1926=100.

Prices and Price Indexes 1913-1931, p. 122, and Monthly Mimeographs 1933-1934.

6. Monthly Review of Business Statistics, p. 8, and Monthly Indexes of the Physical volume of business in Canada, supplement to the Monthly Review of Business Statistics, November, 1932.

External Trade.—The value of domestic exports from Canada during the six months ending September was 317 million dollars compared with 265 million during the same period of 1933. The value of exports for the twelve months ending September was 631 million dollars whereas in the same period ending September in 1933 it was 505 million. The value of imports during the six months periods referred to above was 264 million as against 200 million and for the twelve months ending September this year the value was 497 million, whereas in the preceding twelve month period it was 385 million. This improvement in external trade is a hopeful sign.

Drought in United States.—*The Agricultural Situation* published by the Bureau of Agricultural Economics at Washington, D.C., in the issue of October 1st, in part refers to the effects of drought as follows:

"The lasting consequences of the drought, as long foreseen, are now coming to rest upon the live stock industries. With corn and oats about half an average crop, and with hay much the smallest crop in 15 years, the problem is to find means for carrying foundation stock after the emergency reduction of the flocks and herds. This curtailment, already under way, will go on probably all winter. It means apparently that the country will begin the year with 8 to 10 million fewer cattle than it had a year previous. It means probably the smallest supply of hogs this winter in 20 years and very likely still smaller supplies a year from this winter".

The index of farm prices in United States (August 1909–July 1914 = 100) advanced from 96 in August to 102 in September. Among the sub-indexes that for grains rose from 106 to 112. Cotton and cotton seed advanced from 107 to 110. Fruits fell from 101 to 93; truck crops rose from 108 to 110, dairy products from 97 to 99, chickens and eggs from 86 to 104; meat animals advanced from 68 to 82. The index of the ratio of prices received to prices paid rose from 77 to 81, the highest thus far during the year.

A Levy on Bacon Imports.—Uneven supplies of bacon and consequently more or less unsatisfactory prices for English bacon has caused criticism of the pigs marketing scheme and the bacon marketing scheme among farmers in some sections of Great Britain and it is now proposed that the government should make a levy on imports of bacon. The government has not indicated what action will be taken but it is an interesting development.

LA SITUATION ÉCONOMIQUE

PRÉPARÉE PAR LA DIVISION DE L'ÉCONOMIE AGRICOLE DU MINISTÈRE DE L'AGRICULTURE À OTTAWA, D'APRÈS DES DONNÉES BASIQUES RECUEILLIES PAR LE BUREAU FÉDÉRAL DE LA STATISTIQUE

De 72.3 qu'il était en août l'indice des prix de gros au Canada a rétrogradé à 72.0 en septembre. Il y a eu un recul également dans les sous-indices des produits végétaux; des fibres, des textiles et des produits textiles; du bois, des produits du bois et du papier; du fer et ses produits et des métaux non ferreux. Il y a eu, par contre, un relèvement de l'indice pour les animaux et leurs produits; les minéraux non métalliques et les produits chimiques et similaires. Pendant les neuf premiers mois de 1934 l'indice des prix de gros était en moyenne de 71.7 contre 66.7 pendant la même période l'année dernière.

Prix du détail.—Les prix du détail se sont relevés légèrement en septembre, l'indice montant à 79.0, tandis qu'il était à 78.5 en septembre 1933. L'indice des prix des denrées alimentaires, qui était à 69.3 en août, est tombé à 68.8. Des hausses ont été enregistrées dans les indices du combustible, des vêtements et d'autres produits, mais le relèvement des indices des vêtements peut être dû à la revision trimestrielle.

Embauchage.—L'indice de l'embauchage était à 100.0 au 1er octobre contre 98·8 au 1er septembre (1926 = 100). Les indices des différentes industries en ce qui concerne l'embauchage étaient aux points suivants aux dates qui précèdent: manufacture, 94.4 et 94.3; billots 113.4 et 85.6; mines 117.9 et 112.4; communications 81.3 et 82.5; transports 84.8 et 83.6; construction et entretien 117.0 et 118.1; services 116.2 et 125.5; commerce 120.0 et 117. C'est là une situation très satisfaisante.

Volume physique des affaires.—Le volume physique des affaires a un peu diminué en septembre. L'indice était à 99.0 en août ce qui représentait une forte augmentation. En outre, il y avait eu, en septembre, qui est un mois de trente jours, cinq samedis et cinq dimanches, ce qui, naturellement, affecte le nombre des jours de travail et, par conséquent, l'indice. Il n'est pas surprenant qu'il y ait eu une baisse dans ces conditions. La production industrielle est tombée à 97.5. Dans le groupe des produits manufacturés, les denrées alimentaires ont fait un gain considérable. La production du fer et de l'acier s'est bien maintenue. Les indices des exportations et des importations se sont relevés. La production d'énergie électrique n'a pas accusé le gain normal habituel. Les chargements de wagons étaient en augmentation mais cette augmentation était inférieure à celle que l'on enregistre ordinairement à cette saison de l'année. Les livraisons de tabac, la production de papier à journal, de bois et d'automobiles, étaient inférieures à celles du mois précédent. Les débits de banques ont modérément diminué. L'indice du bâtiment était à 41.3. Le nombre de contrats était en augmentation mais les permis de construction étaient plus faibles qu'en août. Les ventes agricoles étaient inférieures à celles d'août, principalement à cause des expéditions de grain qui étaient inférieures à la normale, contrecarrant ainsi l'augmentation qui s'est produite dans les expéditions de bestiaux. Envisagée au point de vue du temps, la situation est plus rassurante en ce sens que l'indice du volume physique des affaires accusait une moyenne de 94.0 pendant les neuf premiers mois de 1934 contre 77.4 pour la même période en 1933.

Produits agricoles.—L'indice des prix de gros des produits agricoles canadiens qui était à 61.6 en août est tombé à 61.3 en septembre. Le prix moyen du blé du Nord Manitoba No. 1 était à 82.3c. en septembre tandis qu'il était à 86.0c. en août. Les prix du blé ont baissé parce que la demande européenne s'est ralentie, que l'Argentine a mis sur le marché d'assez gros approvisionnements et que la France a offert à prix relativement bas des quantités de blé de catégorie inférieure. La situation du blé est certainement meilleure que l'année dernière mais la demande n'a pas été

aussi forte que l'on espérait au commencement de l'année de récolte. Le commerce de l'avoine a fait preuve d'une activité considérable, à prix un peu plus élevés, et les prix de l'orge ont monté tandis que les recettes pour le seigle et le lin diminuaient. L'indice des prix des produits animaux s'est élevé de 63.1 à 65.3. Cet indice a été plus affecté par les hausses de prix des oeufs, du lait, des cuirs et des peaux que par la baisse de prix pour les animaux en vie, spécialement les boeufs et les agneaux.

Commerce extérieur.—La valeur des exportations domestiques du Canada pendant les six mois finissant en septembre a été de 317 millions de dollars contre 265 millions pendant la même période en 1933. La valeur des exportations pendant les douze mois finissant en septembre a été de 631 millions de dollars contre 505 millions pendant la même période finissant en septembre 1933. La valeur des importations pendant les périodes de six mois mentionnées ci-dessus a été de 264 millions contre 200 millions et pendant les douze mois finissant en septembre cette année, la valeur a été de 497 millions, tandis que pendant les douze mois précédents elle avait été de 385 millions. Cette amélioration du commerce extérieur est un symptôme encourageant.

La sécheresse aux Etats-Unis.—La situation agricole publiée par le Bureau de l'économie agricole de Washington, D.C. traite des effets de la sécheresse dans les termes suivants (Numéro d'octobre):

"Les conséquences durables de la sécheresse, depuis longtemps prévues, affectent maintenant les industries animales. Les récoltes de maïs et d'avoine n'atteignent guère que la moitié de la récolte ordinaire; la récolte de foin est la plus faible que l'on ait rentrée depuis 15 ans, et le grand problème est de trouver un moyen de faire vivre les bêtes, même après la réduction que l'on a faite dans l'effectif des troupeaux. Cette réduction, déjà entreprise, durera probablement tout l'hiver, et il est probable qu'il y aura dans le pays au commencement de l'année, de 8 à 10 millions de bovins de moins que l'année précédente. La population porcine de cet hiver sera sans doute la plus faible que l'on ait vue depuis 20 ans et elle sera tout probablement encore réduite un an plus tard."

L'indice des prix de ferme aux Etats-Unis (août 1909-juillet 1914 = 100) qui était à 96 en août est passé à 102 en septembre. Parmi les sous-indices, celui des grains s'est élevé de 106 à 112. Le coton et la graine de coton ont passé de 107 à 110. Les fruits sont tombés de 101 à 93; les récoltes maraîchères se sont élevées de 108 à 110, les produits laitiers de 97 à 99, les poulets et les oeufs de 86 à 104; et les animaux à viande de 68 à 82. L'indice de la relation entre les prix reçus et les prix payés s'est élevé de 77 à 81, c'est l'indice le plus élevé que l'on ait encore enregistré cette année.

Une levée sur les importations de bacon.—L'irrégularité des approvisionnements de bacon occasionnant des prix plus ou moins peu satisfaisants pour le bacon anglais a provoqué une critique du plan de vente des porcs et du plan de vente du bacon parmi les cultivateurs de certaines parties de la Grande-Bretagne, et l'on propose maintenant que le gouvernement impose une taxe sur les importations de bacon. Le gouvernement n'a pas encore indiqué les mesures qu'il prendra mais le développement noté est intéressant.

AVIS POUR LES LECTEURS FRANCAIS

Nos lecteurs de langue française ne trouveront pas dans ce numéro, les résumés habituels des articles anglais. Ces articles et les rapports de comité sont si longs qu'il aurait été très difficile d'en faire une analyse. D'ailleurs, ces travaux et ces rapports constituent par eux-mêmes un résumé de programmes, et comme ils sont à peu près entièrement dépourvus de termes techniques, la lecture dans la forme originale ne devrait présenter aucune difficulté. Les lecteurs qui désireraient avoir des renseignements détaillés, en français, sur les sujets présentés par les Drs. Wickware, Rosell, Conklin et Parnell sont priés de se mettre directement en communication avec ces auteurs. Le travail par M. Thiéry, de Dijon, France, a été présenté à la convention annuelle de la Société des Agronomes Canadiens, au Collège Macdonald, le 27 juin, 1934. La visite de M. Thiéry au Canada a pu se faire grâce à l'obligeance du Gouvernement français et du Gouvernement de la Province de Québec.

ANNUAL MEETING OF THE CANADIAN SOCIETY OF ANIMAL PRODUCTION—EASTERN SECTION

The fifth annual meeting of the Canadian Society of Animal Production—Eastern Section was held at Macdonald College, P.Q., under the chairmanship of the President, Prof. J. C. Steckley of the Ontario Agricultural College, Guelph. The papers and main committee reports presented at this session were assembled by the Secretary of the Society, Mr. E. B. Fraser of the Animal Husbandry Division, Central Experimental Farm, Ottawa. The following officers were elected for the year 1934-35:

President—Mr. C. F. Bailey, Dominion Experimental Farm, Fredericton, N.B.

Vice-President—Prof. A. R. Ness, Macdonald College, P.Q.

Secretary-Treasurer—Mr. E. B. Fraser, Central Experimental Farm, Ottawa, Ont.

Maritime Director—Mr. W. W. Baird, Dominion Experimental Farm, Nappan, N.S.

Quebec Director—Mr. S. J. Chagnon, Provincial Nursery, Deschambault, P.Q.

Ontario Director—Prof. R. G. Knox, Ontario Agricultural College, Guelph, Ont.